MAR 19 1928

...CAL ROOM
...AL LIBRARY
... OF MICH.

The Journal of EDUCATIONAL PSYCHOLOGY

Devoted Primarily to the Scientific Study of Problems of Learning and Teaching.

BOARD OF EDITORS

HAROLD RUGG, *Chairman.*

J. CARLETON BELL — ARTHUR I. GATES — RUDOLF PINTNER — L. M. TERMAN
FRANK N. FREEMAN — V. A. C. HENMON — BEARDSLEY RUML — E. L. THORNDIKE

VOL. XIX
No. 3

MARCH, 1928

$4.00 a year.
60c per copy.

CONTENTS

A MENTAL SURVEY OF THE DEAF. *R. Pintner*. 145
A STUDIOUSNESS QUESTIONNAIRE. *Percival M. Symonds*. 152
AN APPLICATION OF THE MARSTON INTROVERSION-EXTROVERSION RATING SCALE. *Nellie Eva Powers*. 168
STATISTICS SHOW. *Harvey C. Lehman and Paul A. Witty* . . . 175
SOME RESULTS OF TEACHING BEGINNERS BY THE LOOK-AND-SAY METHOD. *R. M. Mosher*. 185
A COMMENT ON PARTIAL CORRELATION. *Raymond Franzen*. . . 194
NOTES ON ARTICLES IN EDUCATIONAL PSYCHOLOGY IN CURRENT ISSUES OF OTHER MAGAZINES 198
NEW PUBLICATIONS IN EDUCATIONAL PSYCHOLOGY AND RELATED FIELDS OF EDUCATION 202
PUBLICATIONS RECEIVED 207

Published Monthly Except June to August by

Warwick & York, Inc.,

York, Pa. Baltimore, Md.

Entered as Second Class matter November 15, 1921, at the Post Office at York, Pennsylvania under the Act of March 3, 1879.

The Journal of Educational Psychology

is published monthly, by Warwick & York, Inc., Baltimore, Md., and York, Pa. Title page and index are bound in December number.

Manuscripts for publication, books, or other materials for review, and news items should be addressed to Harold Rugg, Chairman of the Editorial Board, 400 W. 118th Street, New York City.

The price of the Journal is $4.00 a year, payable in advance. Foreign postage is 30 cents extra. Single current issues are 60 cents each, and less than a full year's subscription charged at single issue rate for every month ordered. Back volumes $5.00 each; single back issues 90 cents each.

Subscribers should notify the publishers of change in address at least four weeks before publication of the issue with which change is to take effect. No claim for non-receipt of an issue will be entertained unless made within two weeks after receipt of the next succeeding issue.

Warwick & York, Inc.,

Baltimore, Md.

TEACHERS' HEADQUARTERS

European Plan

Entirely Fire-Proof

Centrally Located

EDWARD DAVIS
Manager

HOTEL RENNERT
BALTIMORE, MARYLAND

The "Supreme Authority" for the Schools

Webster's New International Dictionary

Constantly revised and improved to keep abreast of modern needs and information.

Thousands of NEW WORDS such as audion, joy stick, Coolidge tube, Fascisti, radiophone, Freud, aerograph, eugenism, etc.

Whatever Your Question about words, persons, places, you find here a ready accurate answer. 2,700 pages; 452,000 entries, including 408,000 vocabulary terms, 12,000 biographical names, 32,000 geographical subjects; 100 tables; 6,000 illustrations.

One of the wisest of our school superintendents says: "I have never yet seen a person, whether pupil or teacher, who was accustomed to the frequent use of the dictionary who was not at the same time a good or superior all-round scholar. A better test than this of the value of dictionary work could not be found.

Write for Helps in Teaching the Dictionary, FREE.

G. & C. MERRIAM COMPANY
Springfield, Massachusetts

SCHOOL AND SOCIETY

A weekly journal covering the field of education in relation to the problems of American democracy.

The objects of SCHOOL AND SOCIETY are the advancement of education as a science and the adjustment of our lower and higher schools to the needs of modern life.

It encourages discussion of all problems from every point of view; it pays special attention to foreign affairs; it publishes accounts of educational events of the past week and research on fundamental problems.

Subscription $5.00—Single Numbers 15 Cents

SCHOOL AND SOCIETY will be sent to new subscribers for thirteen weeks for one dollar, which may be sent at the risk of the publisher.

THE SCIENCE PRESS
Grand Central Terminal - - New York, N.

THE JOURNAL OF
EDUCATIONAL PSYCHOLOGY

Volume XIX March, 1928 Number 3

A MENTAL SURVEY OF THE DEAF

R. PINTNER

Teachers College, Columbia University

Under the auspices of the National Research Council a nation-wide survey of schools for the deaf in the United States has been undertaken.[1] Many facts relating to the administration and personnel of the schools were gathered as well as many facts concerning the children. In addition a great many children were given the Pintner Non-language and Educational Survey Tests. The Non-language Tests are well adapted to deaf children and they have been fully described elsewhere.[2]

This article will deal with the results obtained on the Non-language and Educational Survey Tests given to 4432 children. These children were all of those aged 12 and above found in 41 schools included in the survey. The schools were fairly well distributed over the United States, and the geographical distribution of the children tested shows a fair agreement with the percentage distribution of the deaf according to the analysis of the distribution of the deaf by the census bureau.[3] There is close agreement of the percentages in the following divisions: New England, Mountain and Pacific, West North Central, South Atlantic, East South Central and West South Central. The Middle Atlantic section contains a larger percentage of children tested, and the East North Central a smaller percentage. On the whole, however, the children tested are probably very typical of deaf children in general in the United States.

[1] For a report on this survey in general and a more detailed account of the testing described here, see *American Annals of the Deaf*, Vol. LXXI, 1926, No. 2, and No. 4; and Vol. LXXII, 1927, No. 5.

[2] Pintner, R.: Results Obtained with the Non-language Group Test. *Journal of Educational Psychology*, Vol. XV, 1924, pp. 473–483.

[3] "Deaf Mutes in the United States, 1920." Bureau of Census, Department of Commerce, Washington, D. C., 1923.

Comparison of Deaf and Hearing Children.—The 12, 13, 14 and 15 year old children were used in this comparison. There are between 500 and 600 deaf children for each of these ages. The hearing children, with whom these deaf children are compared, consist of the random sampling of children used in the standardization of the two tests for the hearing. There are over 1000 of such children for ages 12, 13 and 14 and 700 for age 15. On the whole these samplings of deaf and hearing children are good, the poorest being the 15 year old hearing group. It probably does not contain a sufficient number of children of superior intelligence, because it is largely made up of pupils in the elementary schools. This might depress the hearing norms. At any rate the deaf are not being compared with superior hearing children.

TABLE I.—COMPARISON OF DEAF AND HEARING

Ages	12	13	14	15
Non-language Test				
Mean hearing	321	348	362	364
Mean deaf	257.7	275.6	300.5	320.1
Difference	63.3	72.4	61.5	43.9
Standard deviation difference	5.22	5.32	5.31	6.13
Ratio	12.12	13.59	11.59	7.16
Educational Test				
Mean hearing	55	62	64	65
Mean deaf	15.8	19.2	22.8	27.4
Difference	39.2	42.8	41.2	37.6
Standard deviation difference	.836	.865	.876	1.131
Ratio	46.89	49.48	47.03	33.24

Table I gives the means for the two tests for the ages in question. The differences between the deaf and hearing means for both tests are large and significant, particularly so in regard to the educational test.

Another way of comparing the two groups is to interpret the mean of the deaf in terms of the means of the hearing. For the intelligence test the mean score of the 12 year old deaf is 258 and this is about the mean for 10 year old hearing; the 13 year old deaf mean corresponds to 10½ year old hearing, the 14 year old deaf mean to 11 year old hearing and the 15 year old deaf mean to 12 year old hearing. For the educational test the discrepancies are still greater. The 12 year old deaf mean is not quite up to the 8 year old hearing mean; the

13 year old deaf mean is just one point above the 8 year old hearing mean; the 14 year old deaf mean is not quite up to the 9 year old hearing mean; and the 15 year old deaf mean is just equal to the 9 year old mean. In other words, the average deaf child from 12 to 15 achieves on this educational test about what the 8 or 9 year old hearing child achieves.

Insofar as the Non-language Test is a measure of intelligence, we find the deaf markedly poorer than the hearing child, but this lag is small as compared with the lag in educational achievement. Here the gap is very considerable. It is undoubtedly due in part to the handicap of language. To what extent improved methods of instruction or better teaching could diminish this gap it is impossible to say, but there is here undoubtedly a fertile field for further experimentation.

Age of Onset of Deafness.—The age at which deafness occurs allows us to raise the question as to this influence upon intelligence and educational ability. The 12, 13, 14 and 15 year olds were tabulated, making a total of 2423 cases.

TABLE II.—MEDIAN INDICES OF INTELLIGENCE AND EDUCATIONAL TESTS
Age of Onset

	Unknown	Birth	0	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Number of cases.....	201	1129	222	259	201	104	75	74	42	43	33	17	17	6	4	1	2423
Intelligence..	48.4	50.0	49.7	50.5	49.6	51.2	52.7	55.1	51.6	51.5	53.1	56.0	56.0	53.0	53	50	50.3
Educational.	45.5	48.8	47.4	48.1	50.0	51.9	56.3	61.2	63.6	62.6	63.3	71	68	68	67	70	49.8

Table II shows the median indices based on the deaf norms. The index is a standard deviation measure similar to the *T* score having 50 at the mean. An inspection of these indices of intelligence in Table II shows no general tendency to rise or fall. This is in marked contrast to the educational indices. Here we find a definite tendency to increase with increase of age of onset of deafness. Having possessed hearing for so many years of life seems to have no effect upon the non-language test, but an increasing effect upon the educational test. Each year of hearing after the second birthday seems to give the child a better chance for educational achievement in later life. With hearing children speech begins at about 12 months, increasing rapidly thereafter. Each year of speaking and hearing gives the child a rapidly increasing vocabulary, such as the child born deaf can not obtain. The advantage of thus acquiring some language before

deafness sets in is evidently very great and is something that affects the language ability in later life. The most marked rise in our table takes place during the third and fourth year. On the average a child who does not become deaf until after his fifth birthday will have a distinct advantage in language work in later life.

Method of Instruction.—By far the greater number of children in schools for the deaf are taught by the oral method, *i.e.*, speech and lip-reading. In some schools, however, some children are taught signs and finger spelling. Some children receive instruction in both oral and manual methods. The 2423 children were divided into groups according as their record showed oral instruction, manual instruction or combined instruction. The two latter groups were small and in this report they have been thrown together and called "others."

TABLE III.—PERCENTAGE DISTRIBUTION OF INDICES

Index	Intelligence		Educational	
	Oral	Others	Oral	Others
0–9	0.5	1.0	0.7	2.1
10–19	1.1	3.5	0.7	1.6
20–29	4.8	11.9	5.9	10.5
30–39	13.4	21.8	15.5	24.9
40–49	24.9	24.4	22.8	27.2
50–59	27.0	19.4	25.6	18.2
60–69	19.3	11.4	16.5	11.2
70–79	7.5	5.0	10.6	3.5
80–89	1.1	1.0	1.0	0.5
90–100	0.4	0.5	0.8	0.3
Median.....	52.0	44.8	51.7	44.0
N.....	1845	578	1845	578

Table III shows the percentage distribution on the two tests for the two method groups. A comparison of the intelligence of the two groups shows a slight tendency for educators of deaf children in general to select the brighter children for oral instruction wherever an option exists. In schools claiming nothing but oral instruction no such selection could take place. There are three times as many "others" as "orals" having very poor intelligence (below an index of 20); and at the upper end 9 per cent of the orals have indices above 70, as contrasted with 6.5 per cent of the others. This selection of

the brighter children for oral instruction is not marked. It is evidently not a conscious selection. Does it mean that the oral method requires more intelligence than the manual? If so, experimental work should determine the amount of intelligence below which it is not profitable to give oral instruction and thus save many children from the terrible grind of lip-reading and speech.

The oral method has always laid claims to great achievements in language. So far as our educational test is concerned, these claims do not seem to have been realized. Children not educated by the oral method alone seem to achieve as much in written language work as do orally educated children, when we take into consideration their intelligence. An inspection of the distributions shows no radical difference between the intelligence and educational indices and the medians for intelligence and education are the same both for the oral group and for the others. This is also true for the manual and combined groups when kept separately.

Obviously these findings challenge very definitely the assumed superiority of the oral method in deaf schools. If the oral method results in better language, then this should be measurable in written work. It has not been found so in the present case. This does not mean the abandonment of the oral method, because the manual method has not shown itself in any sense superior, but merely just as good. The claim for the continuance of oral work in deaf schools must, therefore, shift to the additional advantage that orally taught deaf children have in speech and lip-reading as compared with manually taught children.

Comparison of Schools.—Schools for the deaf, just as schools for the hearing child, differ enormously in the mental make-up of their pupils. The details of these differences can be seen in the more-extended report in the American Annals of the Deaf. Here we merely wish to draw attention to a seeming difference between two types of schools, day and residential. By far the larger number of deaf children in the United States are educated in residential schools. These are for the most part state institutions, the outgrowth of the old deaf and dumb asylums. This survey covered 28 institutions with a total of 3813 children and 14 day schools with a total of 619 children. The large influence of the residential school in the education of the deaf is obvious.

Is this a good influence? Is the residential school as efficient as the day school? This is difficult to answer. So far our data show

median intelligence indices of 53.3, for the day and 47.6 for the residential schools. The day schools are not loaded with as many very dull children as the residential. The educational median indices are 57.3 for the day and 46.3 for the residential schools. This looks as if the day schools were making slightly better use of their mental material than the residential schools. However, a further analysis of these data is contemplated to see what influence the age of onset of deafness may have in this connection.

Summary

1. The Pintner-non-language and Educational tests were given to 4432 children as part of a nation-wide survey of schools for the deaf under the auspices of the National Research Council.

2. All children aged 12 and above were included in the testing program.

3. The geographical distribution of the cases conforms well with the geographical distribution of the deaf in general.

4. Deaf children make poorer scores on the intelligence test than do hearing children, in spite of the fact that no language is required in taking the test.

5. Deaf children do very much poorer work on the educational test than do hearing children. The discrepancy here is much greater than in the case of the intelligence test.

6. The age of onset of deafness has little influence on the intelligence rating, but a decided influence on the educational rating. Each year of hearing after age three or four seems to give an increased facility in language as measured by the educational test.

7. None of the three general methods of instruction, oral, manual or combined, seems to be superior to the others when intelligence is taken into account.

8. The children in day schools do somewhat better than children in residential schools on the educational test, making allowance for the slightly superior intelligence of the day school pupils.

Conclusion.—The outstanding feature of this analysis of the educational and intelligence ratings of deaf children is the very marked divergence of the deaf and hearing in regard to educational attainment, a divergence markedly greater than the divergence between the two groups intellectually. The problem of deaf education would therefore seem to be to close this educational gap between the deaf and the hearing, until it becomes no wider than the gap which exists

between the intelligence of the deaf and the hearing. How this should be done, if it is indeed possible, can not be determined by any such survey as has been made. The survey can only point out the conditions that at present exist. Knowing the conditions however, the way is now clear for further and prolonged investigation and experiment.

Personal suggestions of the writer may here be in order. Questions such as the following should be faced: Would the education of the deaf child be accelerated if it were begun at a much earlier age than is now customary? The most modifiable years of a child's life are the earlier years, and most deaf children spend these without any systematic education. Could not reading be taught earlier and more efficiently than at present, so that deaf children might get a better start with this basic tool? May not the enthusiasm of the oralists have led them to spend too much time on speech and lip-reading at an age when this basic tool of reading should receive more attention? Is the curriculum of the average deaf school developing in the light of modern curriculum research in the hearing school? Is the average teacher of the deaf being trained as well as she should be? Is she getting as good a training for her work as the teacher in the ordinary school for the hearing? These and many other similar questions arise as one works with the data at hand. Further work with the data is contemplated to verify some of the findings and to go into greater detail in some of the problems.

A STUDIOUSNESS QUESTIONNAIRE

PERCIVAL M. SYMONDS

Teachers College, Columbia University

For some time it has been evident that the measurement of ability, as represented by the current intelligence tests, is only one factor to be used in the prediction of school success. A pupil's school work is primarily conditioned by his ability, but there are other factors which operate to make achievement greater or less than the expectations warranted by a measure of ability. Presumably these other factors do not present a unit as does intelligence. Where one boy fails to come up to expectations in school because of poor habits of work another boy will fail because school achievement is a goal that does not seem worth striving for. However, one important group of factors that condition achievement is subsumed under the phrases "liking for school," "studiousness," "interest in school work," and the like. The questionnaire herein reported represents an attempt to measure the studiousness or like for school work of boys in the last years of their high school course. It taps various phases of the interest of boys on items which experimentation has shown to be indicative of this elusive "liking for school." The questionnaire has gone through three revisions covering as many years.

Work on this questionnaire was started in 1924 by Dr. Joseph Butterweck. At that time there were accessible for use as models such questionnaires as Hart's "Test of Social Attitudes," Freyds' questionnaire in his "Personalities of the Socially and Mechanically Minded," and Woodworth's psycho-neurotic questionnaire.

The first edition of the studiousness questionnaire consisted of 13 lists, each list containing from 14 to 20 items. Each item was preceded by a plus and a minus sign, one of which a boy was to encircle to indicate like or dislike for that item. Lists 1 to 3 contained certain words related to effort or industry and others to idleness or recreation. Lists 4 and 5 contained names of articles such as sporting equipment, clothing, machines, instruments, etc., which a boy might or might not care to own. Lists 6 and 7 consisted of things that boys do or do not like to do. List 8 contained names of places to go. Lists 9 and 10 contained statements about school with which a boy might or might not agree. List 11 contained names of magazines and list 12 names of books. List 13 was a list of occupations.

In each list the boys were directed to underline *five* items about which they felt strongly whether plus or minus, and from those five they were to choose *one* about which they felt most strongly.

The questionnaire was originally tried out in the Horace Mann School for Boys. Although the results of this first questionnaire were so discouraging that Dr. Butterweck dropped work on it, the methods employed in analyzing the items and in constructing a scoring key are general and are described here in detail. The studiousness index[1] of each boy was first obtained.

Then the 20 boys having the highest studiousness indices and the 20 boys having the lowest were located. The responses for each of these two groups of 20 boys on each item of the studiousness questionnaire were then tabulated. Let the results for one item be as follows

+	−	Would you like to own a bicycle?
10	10	as marked by 20 good students
14	6	as marked by 20 poor students

Four, the difference between 14 and 10, then constitutes a measure of the validity of this item for the purpose of differentiating good students from poor students. The greater the difference the more the item differentiates between these two extreme groups.

Besides the studiousness index, teachers' ratings on studiousness were used as a criterion against which to test each item for its differentiating power. The items selected by this method were not in all cases the same as those selected by the method using studiousness indices.

A scoring key was made using a number of the items which showed high differentiating powers. A score of 2 was given any item answered in the direction corresponding to the direction of studiousness as shown by the analysis. A score of 1 was given for any item answered in the opposite direction from that which indicated studiousness. A score of 3 was given for an underlined item answered in the direction corresponding to that of studiousness and a score of 0 for any

[1] The studiousness index is described in the author's "Measurement in Secondary Education." The Macmillan Company, pp. 521–525. In brief, to obtain the studiousness index, scores on an intelligence test are obtained (The Terman Group Test of Mental Ability was used). Then the term marks are reduced to a numerical basis and averaged for each boy. The mean and standard deviation of the distributions for both the intelligence test and school marks is found and each boy's intelligence and scholastic record is turned into standard deviation units. The studiousness index is the difference between scholastic attainment and intelligence after each is reduced to the common unit of the standard deviation.

underlined item answered in the opposite direction from that indicating studiousness.

In the first three lists only two words out of the 60 used showed high differentiating power and hence in subsequent revision this type of list was not used. The two significant words were *ease* (−) and *study* (+). (The plus sign indicates that studious boys like the item and tend to mark it plus more often than non-studious boys. The minus sign indicates that studious boys tend to mark an item minus more often than non-studious boys. A similar interpretation may be given to all subsequent plus and minus signs.) The other lists yielded a larger number of significant items and were tried out in later revisions. The correlations of this first form of the questionnaire were so low as to discourage its maker from doing further work with it.

In 1925 Mr. George W. Bradshaw revised the first draft of the studiousness questionnaire and tried it out in the Brooklyn Polytechnic Preparatory Country Day School. This second edition contained the following lists:

STUDIOUSNESS QUESTIONNAIRE—1925 EDITION

List	Number items	Character of items
1	46	Things a boy might like to own
2	64	Occupations
3	36	Activities
4	28	Places to go
5	21	Sports
6	33	Magazines
7	13	Types of theatres and motion pictures
8	13	Sections of a newspaper
9	37	Statements about school
10	50	Books
	341	

In the second edition three symbols, +, ., −, were placed before each item, providing for a neutral reaction as well as reactions indicating like or dislike. Further than this no provision was made for obtaining responses regarding the strength of the like or dislike. All items were to be answered, the dot permitting a response in case no positive like or dislike was felt, or when the subject had no knowledge of the item.

The items were validated as previously described using the studiousness index as a criterion.

A score of 3 was given to every answer in the same direction as studiousness, a score of 2 for every neutral response and a score of 1 for every response in the opposite direction from studiousness.

The following correlations were found.

Let 1 = Terman Group Test of Mental Ability.
2 = Average of School Marks.
3 = Teachers' Rating of Studiousness.
4 = Studiousness Index.
5 = Studiousness Questionnaire.

	2	3	4	5
1	.19	.30	−.56	−.37
2	...	.78	.61	.52
3	...	...	.51	.62
4	...	...	.....	.75
5				

These correlations with the studiousness questionnaire are undoubtedly too high inasmuch as they are obtained on the same data which was used in validating and selecting the items. However they gave evidence that the second edition was more significant than the first.

The lists of sports, types of theatres and moving pictures, sections of a newspaper and books contained so few significant items that they were not tried again.

In 1926 the writer made a third revision using the experience of the two previous forms of the questionnaire for suggestions. The form itself was not changed from that used in the second revision as the mechanical features then proved satisfactory. A new list of items was added on which judgments of right or wrong were to be given. This new list used suggestions given by Chambers who tried out the Pressey X-O tests to determine their relationships with college work. All items in previous forms which did not show significance were discarded. Additional items were added after a scrutiny of the kinds of items which were kept and rejected in previous forms.

The 1926 revision was tried out in the Brooklyn Polytechnic Preparatory Country Day School, the McBurney School, and the Montclair High School. Items were evaluated as previously in the Brooklyn Polytechnic Preparatory School and the McBurney School on the basis of the studiousness index and in the Montclair High School on the basis of teachers' judgments of studiousness. These

three independent evaluations of items were then pooled, the 100 most significant items were selected, and the questionnaire scored on a key made from these 100 items.

Correlations were computed on the data from the McBurney School and the Montclair High School.

The self-r (50 items against 50 items) was .732 for the McBurney School (N = 80) and .695 for the Montclair High School (N = 213). Using the Spearman-Brown formula the reliability of the whole questionnaire becomes .846 and .820 respectively.

CORRELATIONS—MCBURNEY SCHOOL

Let 1 = Terman Group Test of Mental Ability.
2 = Average of School Marks.
3 = Teachers' Rating of Studiousness.
4 = Studiousness Index.
5 = Studiousness Questionnaire.

	2	3	4	5
1	.339	.017	....	−.337
2	....	.556	....	.121
3	....	....	.475	.232
4	....	....	....	.397
5				

The multiple correlation for predicting school marks using a combination of the Terman test and the studiousness questionnaire was .415, a gain of .075 over that obtained using the Terman test alone.

In the Montclair High School the correlations found are

r teacher rating on studiousness—studiousness questionnaire.. .373
r average marks—studiousness questionnaire..... .252

The revised studiousness questionnaire is on page 157. The responses for 121 boys from the three schools are given in the first three columns. In the fourth column a cumulative validity difference is given. A plus difference in the fourth column indicates that the item was answered positively by studious boys to a greater degree than by non-studious boys. A minus difference indicates that the item was answered negatively by studious boys to a greater degree than by non-studious boys. The difference is a measure of the differentiating power of the item.

In the fifth column the symbol + or − is given for those 100 items which were selected as being the most significant. The distribution and correlations reported in this study are based on scores derived from these one hundred items.

Studiousness Questionnaire

This test that you are going to take is a way of measuring your interest in various things, occupations, and activities, which people in general are interested in. Be strictly honest in answering the questions. The necessary directions are given before each test. Read those directions carefully. You will have plenty of time, but it is necessary that you work fast.

Test I

The list of items below consists of a number of things to own. In front of each item you will see a plus sign (+), a minus sign (−) and a dot (.).

Make a circle around the + if you like the article and wish to own it.

Make a circle around the − if you dislike the article and would rather not own it.

Make a circle around the . if you do not care either way.

Some of the items you may already own. Mark these just the same. You will have plenty of time for all the tests, but it is necessary that you work rapidly.

Mark every item.

Sample

⊕ . − Automobile
+ . ⊖ Radio tube
+ ⊙ − Guitar

+	.	−	Validity	Key		+	.	−	Validity	Key	
119	2	0	+ 2	..	Automobile	79	36	6	− 7	..	Flash light
34	53	34	−19	−	Bicycle	60	47	14	− 6	..	Fur gloves
30	48	43	+ 4	..	Brief case	70	25	26	+23	+	Golf clubs
49	25	47	−27	−	Bull dog	27	50	44	− 9	..	Guitar
73	29	19	−11	−	Camping outfit	49	33	39	−11	−	Hockey stick
50	32	39	+12	+	Chemistry set	61	43	17	−12	−	Hunting knife
23	35	63	−15	−	Cigarette case	78	30	13	− 2	..	Map of the world
31	31	59	−25	−	Cigarette lighter	56	38	27	−20	−	Pack of cards
38	34	49	+13	+	Collection of stamps	33	37	51	−29	−	Poker chips
13	51	57	+ 3	..	Crayons	106	14	1	+ 2	..	Portable typewriter
84	31	6	+ 5	..	Dinner suit	41	32	48	−38	−	Revolver
52	43	26	− 7	..	Drawing instruments	85	18	18	−23	−	Rifle
60	32	29	− 9	−	Electrical apparatus	7	28	86	−24	−	Set of dice
108	11	2	− 3	..	Encyclopedia	44	40	37	+ 7	..	Ukulele
44	37	40	−17	−	Engineer's handbook	23	33	65	− 7	..	Walking cane

TEST 2

The list of items below consists of a number of occupations or professions. In front of each item you will see a plus sign (+), a minus sign (−) and a dot (.).

Make a circle around the + if you like the kind of work.

Make a circle around the − if you dislike the kind of work.

Make a circle around the . if you are indifferent about the occupation.

Do not think of the occupation as though you were choosing it for your own. Assume that you have the ability to do the work of any of the occupations. Indicate whether you like the kind of work involved in the various occupations regardless of the financial return or social standing incidental to each.

Mark every item.

OCCUPATIONS

+	.	−	Validity	Key		+	.	−	Validity	Key	
56	32	33	−24	−	Actor	44	37	40	−24	−	Football coach
16	16	89	−10	−	Animal trainer	41	37	43	− 9	..	Jazz orchestra player
64	22	35	0	..	Architect	44	31	46	− 5	..	Judge
51	28	42	− 6	..	Artist	29	30	62	−16	−	Life guard at a beach
51	38	32	−22	−	Athletic coach	7	31	83	− 2	..	Linotypist
66	27	28	−37	−	Aviator	11	30	80	− 8	..	Mounted policeman
21	32	68	+14	+	Bank cashier	57	26	38	+ 6	..	Musician
58	29	34	− 1	..	Building engineer	21	21	79	+ 9	+	Opera singer
46	25	50	+15	+	Chemical engineer	21	36	64	+ 8	..	Photographer
22	20	79	+ 9	..	College professor	16	23	82	+ 3	..	Preacher or priest
29	33	59	−10	−	Comedian	34	23	64	−19	−	Professional baseball player
29	44	48	−18	−	Detective	45	42	34	+ 4	..	Physician
29	34	58	+14	+	Draftsman	10	21	90	0	..	School superintendent
58	24	39	+ 6	..	Editor	17	24	88	− 4	..	School teacher
52	30	39	+ 1	..	Electrical engineer	56	32	33	−30	−	Short story writer
61	27	33	+ 6	..	Explorer of ancient ruins	12	15	94	− 9	..	Steam shovel operator
19	31	71	− 5	..	Farmer	36	45	40	−17	−	Swimming instructor

Test 3

The list of items below consists of a number of things people like or dislike to do. In front of each item you will see a plus sign (+), a minus sign (−) and a dot (.).

Make a circle around the + if you like to do the activity.

Make a circle around the − if you especially dislike the activity.

Make a circle around the . if you are indifferent towards the activity or do not care about it either way.

Mark every item.

Activities

+	.	−	Validity	Key		+	.	−	Validity	Key	
56	47	18	+25	+	Attend a lecture on travel	74	40	17	0	..	Go out with a girl
69	29	23	−25	−	Auto speeding	52	33	36	− 5	..	Go to summer military training camp
75	27	19	−19	−	Beat another fellow in some way	17	33	71	−22	..	Go to the city and "knock around"
12	17	92	−23	−	Be chased by a traffic policeman	36	33	52	−19	−	Go to the races
84	25	12	+ 1	..	Be class president	28	37	56	−28	−	Have a wild time in general
3	6	112	−10	−	Be in an auto wreck	5	46	70	−19	−	Listen to smutty stories
0	4	117	0	..	Chew tobacco	116	5	0	+ 3	..	Pass in school work
46	40	35	+ 9	+	Collect curios	38	35	48	−25	−	Play poker
74	34	13	− 8	..	Dance	5	23	93	− 9	−	Shoot craps
34	27	60	−38	−	Day dream	54	37	30	− 3	..	Sing
34	52	35	−12	−	Do card tricks	27	42	52	−17	−	Smoke
53	51	17	− 5	..	Do something that makes people cheer or clap you	20	47	54	−21	−	Stay out late at night
24	41	56	−18	−	Dream	44	53	24	+34	+	Study
116	5	0	− 2	..	Eat a good meal	31	57	33	+ 5	..	Stay at home
62	29	30	+16	+	Experiment in chemistry	28	35	58	+13	+	Study subjects that come hard to me
40	38	43	−25	−	Forget school	3	43	75	−17	−	Swear
0	5	116	− 5	..	Get hurt	50	37	34	−17	−	Teach a dog tricks
41	45	35	+12	+	Get up early	0	18	103	− 8	..	Tell smutty stories
4	75	42	− 5	..	Go around with fellows that have money	66	39	16	−13	−	Visit an amusement park
70	38	13	+ 2	..	Go hiking	33	33	55	−23	−	Walk out on the edge of a cliff
31	43	47	− 3	..	Go out walking all dressed up	69	42	10	−12	−	Wear new clothes

Test 4

The list of items below consists of a number of places to which people like or dislike to go. In front of each item you will see a plus sign (+), a minus sign (−) and a dot (.).

Make a circle around the + if you like to go to the place mentioned.

Make a circle around the − if you dislike to go to the place mentioned.

Make a circle around the . if you are indifferent or if you do not care either way.

Mark every item.

Places to Go

+	.	−	Validity	Key		+	.	−	Validity	Key	
62	46	13	− 9	−	Amusement park	27	53	41	−19	−	Good burlesque show
55	41	25	+19	+	Art museum	98	19	4	+15	+	Home
58	37	26	+17	+	Band concerts	39	37	45	−18	−	Horse race
32	46	43	+ 9	+	Botanical garden	19	13	89	−13	−	Insane asylum
75	29	17	+ 3	..	Broadcasting station	105	13	3	− 3	..	Large ocean liner
23	61	37	+ 3	..	City park	61	44	14	+ 8	..	Large public library
74	31	16	+ 1	..	Coal mine or stone quarry	35	28	58	−32	−	Mountain moonshine still
80	27	14	−11	−	Deep cave	76	37	8	− 9	..	Movies
96	18	7	+ 4	..	Edison laboratories	81	32	8	+ 6	..	Museum of Natural History
102	9	10	−13	−	Europe in a yacht	80	30	11	+ 6	..	Plant of the Westinghouse Electric Company
79	29	13	−11	−	Famous Players' Studio	40	25	56	+11	+	Political convention
51	44	26	−13	−	Good dance hall	82	34	5	+10	+	White House

Test 5

The list of items below consists of a number of magazines people like or dislike to read. In front of each item you will see a plus sign (+), a minus sign (−) and a dot (.).

Make a circle around the + if you have read the magazine and like it.

Make a circle around the − if you have read the magazine and dislike it.

Make a circle around the . if you do not know the magazine at all.

Mark every item.

Magazines

+	.	−	Validity	Key		+	.	−	Validity	Key	
43	53	25	− 4	..	Adventure	92	13	16	+11	+	Popular Mechanics
78	19	24	+ 8	..	American Boy	35	55	30	−17	−	Red Book
55	42	24	− 1	..	Atlantic Monthly	35	57	29	− 6	..	Review of Reviews
63	40	18	− 4	..	Cosmopolitan	22	46	53	+18	+	St. Nicholas
40	38	43	+10	+	Detective Story	102	8	11	−15	−	Saturday Evening Post
113	4	4	0	..	Judge	13	48	60	−12	−	Snappy Stories
106	7	8	− 1	..	Life	28	52	41	−17	−	Vanity Fair
97	12	12	0	..	Literary Digest	32	70	19	+ 6	..	Weekly Pictorial
53	22	46	+ 2	..	Motion Picture	46	58	17	+ 3	..	World's Work
105	8	8	0	..	National Geographic						

Test 6

People differ widely in their attitudes toward the various school activities. The list of items below consists of statements about which there is disagreement. In front of each statement you will see a plus sign (+), a minus sign (−) and a dot (.).

Make a circle around the + if you agree with the statement.
Make a circle around the − if you disagree with the statement.
Make a circle around the . if you are indifferent to it or do not care either way.
Be sure to mark every item. Do not hurry over them too rapidly.

Statements about School

+	.	−	Validity	Key	
45	24	52	− 2	..	A greater amount of freedom should be permitted around the building.
53	32	36	+ 2	..	All Federal and local holidays should be strictly enforced by closing school.
65	2	54	+32	+	A passing mark on all subjects should be a requirement for eligibility on a varsity team.
73	21	27	+ 6	..	A rather strict discipline should be maintained in classes.
92	15	14	− 5	..	Assembly periods should be very entertaining.
59	17	45	+ 2	..	Fellows should be permitted to go out and buy their lunches at any nearby restaurants.
52	10	59	+ 8	..	High School pupils should be allowed to choose all their courses.
76	24	21	+19	+	I prefer a good education to wealth.
29	23	69	− 1	..	Just as much of a worthwhile nature can be accomplished with shorter school hours.
9	4	108	−10	−	Marks in a class should be so distributed that there will be no failures.
37	35	49	+ 7	..	More time should be devoted to laboratory work and less to class recitation.
45	19	57	+ 7	..	Participation in gymnasium classes should not be compulsory.
55	22	44	− 8	..	Pupils should not be limited in the number of clubs they may join.
67	18	36	33	+	Rules that are made should not be broken under any circumstances.
64	21	36	−10	−	Some pupils get on easily because teachers are partial to them.
34	34	53	−15	−	Teachers should not expect pupils to study difficult lessons without giving them a great deal of help.
24	38	59	− 5	..	The enforcement of traffic regulations around the building is a nuisance.
54	32	32	+14	+	There should be a better library with plenty of opportunity to do reference work.
9	8	104	+ 4	..	The use of the library should be restricted to certain stated times, and pupils should not be excused from study periods to go there.
37	38	46	−18	−	Vacation periods should be larger than is now the custom.

TEST 7

Below are some things about which people disagree. Some of them people consider wrong or bad. In front of each item is a plus sign (+), a minus sign (−) and a dot (.).

Make a circle around the + if you consider the item *wrong.*
Make a circle around the − if you do *not* consider the item, *wrong.*
Make a circle around the . if you have no opinion either way.
Mark every item.

+	.	−	Validity	Key		+	.	−	Validity	Key	
67	22	32	− 4	..	Absent-mindedness	91	14	16	+12	+	Overeating
49	29	43	− 5	..	Bashfulness	27	52	42	− 3	..	Pedler
64	24	33	+26	+	Betting	64	42	15	− 1	..	Sham
105	2	14	0	..	Bribery	35	25	61	+10	+	Slowness
78	24	19	+21	+	Craps	48	38	35	+10	+	Socialism
48	32	41	+17	+	Day dreaming	32	28	61	+ 5	..	Sportiness
51	21	49	+13	+	Fear	68	27	26	+ 3	..	Toughness
30	56	35	+14	+	King	14	12	95	+12	+	Union
20	20	81	+24	+	Nerve	71	25	25	+10	+	War

A distribution of scores on the studiousness questionnaire obtained from two schools is given below. These scores are based on the 100 most significant items.

SCORE	*f*
145–149	4
140–144	3
135–139	5
130–134	9
125–129	15
120–124	15
115–119	24
110–114	30
105–109	31
100–104	37
95–99	29
90–94	25
85–89	25
80–84	15
75–79	11
70–74	9
65–69	5
60–64	3
55–59	1
	296

A perusal of the questionnaire shows that the investigators have been more successful in finding items that studious boys do not like than that they do like. Whether this is due to the lack of ingenuity in assembling the items or whether studious boys show a greater homogeneity in their dislikes than in their likes is not known but one suspects that there is some truth in the latter assumption.

In the table below the items standing first in order of validity are given. The English expressions *like* or *does not like* are quite inadequate to convey the meaning intended. These expressions imply that studious boys tend to like or dislike the items more than non-studious boys. For instance it may be said that studious boys do not care to go to Europe in a yacht although the vote is overwhelming both among studious and non-studious boys to travel to Europe in that way. What is meant is that studious boys care to do it less than non-studious boys. Again it may be said that studious boys like to get up early although the truth is that neither the majority of studious or non-studious boys say that they like to get up early. Studious boys say they like to more often than non-studious boys.

A studious boy
- does not like to day dream
- does not care to own a revolver
- does not care to become an aviator
- likes to study
- thinks that rules should not be broken under any circumstances
- thinks that a passing mark should be a requirement for eligibility on a varsity team
- does not care to visit a mountain moon-shine still
- does not care to become a short story writer
- does not care to own poker chips
- does not care to have a wild time in general
- does not care to own a bull dog
- does not believe in betting
- does not care to own a cigarette lighter
- would like to attend a lecture on travel
- does not like auto speeding
- does not want to forget school
- does not care to play poker
- does not care to own a set of dice
- does not want to become an actor
- does not care to become a football coach
- thinks it wrong to display "nerve"
- does not care to own a rifle
- would like to own a set of golf clubs
- does not care to be chased by a traffic policeman

does not care to walk out on the edge of a cliff
does not care to become an athletic coach
does not care to go to the city to "knock around"
does not care to stay out late at night
thinks that it is wrong to shoot craps
does not care to own a pack of cards
does not care to own a bicycle
does not care to become a professional baseball player
is not interested in beating another fellow in some way
does not care to go to the races
does not care to listen to smutty stories
would like to visit an art museum
does not care to go to a good burlesque show
prefers a good education to wealth[1]

These statements paint a picture of the studious boy so far as his tastes go. No boy, of course, exhibits likes or dislikes uniformly in favor of or against studiousness. The foregoing items may be considered to give the following picture of the extremely studious boy.

The studious boy is willing to profess the conventions held up as standards for youth. The studious boy is not given to idle pursuits. He abhors games of chance, especially those that involve betting or gambling. He prefers to avoid danger or excitement—does not care to shoot, nor go auto speeding nor ride in an aeroplane. He is fond of school and wants school conducted in an orderly, regular way so that he can get the most possible out of his classes. He likes sport

[1] The first 25 or so of the items in the list are statistically significant. The next items do not satisfy the strict requirement of showing a difference equal or exceeding three times the standard error of the difference, but there is still high probability that they indicate real differences. The significance of an item was determined as follows: Let the item be "Do you like to day dream"

Studious Boys	Non-studious Boys
+ 9	+25
.10	.16
−41	−19
60	60

The biserial-*r* for these two distributions is .458. The standard error of biserial-*r* is .093. In this instance the bi-serial-*r* is 4.92 times its standard error.

Biserial-*r* for other items sampled at random are:

"Do you care to own a revolver?" ..... 472 ± .09
"Do you want to have a wild time in general?" ..... 384 ± .10
"Do you care to become a football coach?" ..... 323 ± .10
"Do you want to own a rifle?" ..... 483 ± .09
"Do you want to own a pack of cards?" ..... 277 ± .11

but is more interested in perfecting his own skill and playing a good game than in beating the other fellow. He is interested in art, music, travel and science. He prefers to be clean in thought and act and despises sham.

So far as our data go the studious boy does not differ from the non-studious boy in his liking for healthy sport, dress, girls, the professional careers, positions of prominence, eating, humor and fun. In other words he is no less healthy in his likes or dislikes than the non-studious boy, but is more willing to obey the rules of the game.

It is believed that the studiousness questionnaire herein described promises to be a valuable instrument for the diagnosis of studious inclinations. It is believed that it will prove a supplement to intelligence tests for the prediction of success in school. The evidence on which this belief is based is as follows:

1. The questionnaire has a comparatively high reliability or internal consistency. It has a reliability of the same order as is found in our accepted standardized tests in school subjects. It is measuring something with some accuracy and consistency. If items had been chosen at random or if the scoring key had been made by guess work the questionnaire would show a zero reliability. As it is, boys who answer some of the questions in the direction indicated by the answer key tend to answer the rest of the questions in the same direction.

2. The results of the test correlate positively with teachers' estimates of pupils' studiousness, also with the index of studiousness. Those correlations were found in schools which had only one-third share in determining the scoring key, so that the *statistical favoritism* which is often found where tests are validated on the same data in which they are standardized is not present to a marked degree. These correlations are in each case low: .37, .40 and .23, but the attenuation is undoubtedly very large, inasmuch as the reliability of studiousness index is known to be low and the teachers' ratings of studiousness are influenced by general impression of ability. The questionnaire also correlates low with achievement and negatively with intelligence.

3. Many of the items of the questionnaire show statistical significance in distinguishing between very studious and very non-studious boys.

4. A certain consistency is noticeable in the results of the questionnaire. Certain of the items were inadvertently repeated. These items are shown by the analysis to be consistently diagnostic in the same direction. The items about the owning of a cigarette case or

cigarette lighter and smoking, the items about owning poker chips or a pack of cards and playing poker and not believing in betting or craps, the items about owning a hunting knife, a revolver or a rifle, the items *actor* and *comedian*, the items *athletic coach*, *football coach*, *life guard* and *professional baseball player*, the item about day dreaming repeated in lists 3 and 6, the items about study, all show a consistency in the way in which they were responded to. This consistency which is exhibited by the reliability coefficient, does not depend upon the whims of the investigators, but is a result of the objective treatment of the data.

5. Finally the portrait of the studious boy which may be drawn by means of the scoring key coincides in a remarkable way with one's expectations. To be sure, we could not have predicted the results and the items in the third revision of the questionnaire were selected only by following clues which were opened up by the preliminary forms, but once the picture is presented it is recognized as being true.

Before this questionnaire can be put to practical use with assurance more questions concerning it will have to be answered. For instance, the question always is raised in connection with a questionnaire of this kind as to whether or not pupils will tell the truth. We have no evidence on this matter. Certainly some pupils' answers to items which opposed conventions or standards would shock their parents, so that it is evident that they did not try to deceive. In fact this questionnaire offered an opportunity for freedom of expression to some which was denied in the actual conduct of life. In giving the questionnaire, the statement was made that it was to be used to gather information about boys' interests. In conversation with pupils or teachers no one was found who discovered the intended significance of the questionnaire.

One should likewise know whether the distribution of scores on the test and the significance of the items holds among pupils of different economic and social levels. Also there are surely other items which have equal significance with those already used for a questionnaire to diagnose studiousness. Although a questionnaire of the type herein described has many difficulties in construction which are not found in assembling an achievement test, in one way it is simpler. There can be no practice effect in the use of a questionnaire, consequently only one form need be prepared and the best items may be put in that form. It is probable, however, that it is best to sprinkle

through the questionnaire insignificant items to throw the pupil off the scent of the real purpose of the questionnaire.

There is no reason why questionnaires cannot be assembled to diagnose every phase of man's activities and interests using a technique similar to that outlined in this paper. Using empirical methods of selecting and rejecting items, it should be possible to find items which correlate significantly with every phase of man's life. In the measurement of conduct, investigators have been blocked because conduct does not leave behind a permanent record to study and measure. This can be accomplished by great effort and expense by setting up special situations in which an objective record may be obtained as has been done by the Character Education Survey. There is always danger in these methods that a narrow or artificial sampling of the precise conduct to be studied may be tested or that extraneous variables, as for example motives, may vitiate the results. It should, however, be possible to find by trial and error methods verbal responses which will correlate with almost any conduct trend. This paper shows how the method has been applied to the particular conduct group called *studiousness.*

Resumé.—A questionnaire has been constructed which is diagnostic of studiousness. It correlates positively with teachers' estimates of studiousness, with the studiousness index and with school achievement and negatively with intelligence. Although several questions will have to be answered before it can be used with assurance, it is hoped that eventually an instrument of this kind will be perfected which will yield a supplement to intelligence tests in the prediction of school success.

AN APPLICATION OF THE MARSTON INTROVERSION-EXTROVERSION RATING SCALE[1]

NELLIE EVA POWERS

Principal, Frances E. Willard School, Boston

Purpose of the Study.—1. To determine whether the scale has practical value as a measuring instrument of introversion-extroversion traits of the Frances E. Willard School girls.

2. To discover whether these adolescent, mentally-deficient girls are not more extreme in their tendencies towards introversion and extroversion than the younger, more socially-promising group measured in the Marston Study.

Subjects of the Study.—The subjects of the study are 89 mental deficients of the Frances E. Willard School, Special Class Center for Girls. The physical ages of the girls range from 11 to 16 years, with one special subject who is 18 years of age. The median physical age is 14 years 4 months.

The subjects, commuting to the Center from distant parts of the city, represent 28 of the city's school districts. The girls are of foreign parentage though only 7 were born abroad. They are of 17 different nationalities; the Italian furnishes 33 per cent; the colored, 15 per cent.

Seventy-six of the fathers of the girls, and 13 of the mothers earn the family living at unskilled labor.

The range of mental ages is from 62 months to 144 months, with the median age at 108 months.

Intelligence quotients, obtained from Stanford-Binet Individual Tests range from 48 to 82, with a median at 64.

The Raters.[2]—The six raters are the principal and the five teachers of the school. The raters have had academic training of at least college grade, and have been specially trained in the psychology of the sub-normal. They worked over the study of Dr. Marston as it is given in the University of Iowa Studies in Child Welfare, Vol. III, No. 3, and were able, after much practice in rating other girls than those of the study, to bring their judgments to comparable levels.

---

[1] This study was made at the Frances E. Willard School for Mentally Retarded Girls at Boston, Mass.

[2] Mary M. Bickford, Alice S. Kenyon, Edythe M. McKelligett, Marion M. Burnham, Celena E. Hoar, and Nellie E. Powers.

They have known the subjects for lengths of time varying from 2 to 124 months, with the median time at 28 months.

Rater P does the administrative and psychological work for the school, and teaches some of the academic work.

Rater B teaches embroidery, weaving, beadwork, and other fine handwork.

Rater K teaches sewing, millinery, underwear and dressmaking, paper flower and favor work.

Rater E teaches cookery and housekeeping.

Rater M is the teacher of drawing, simple bookbinding, and other art work.

Rater H specializes in music, physical training, and character education work.

There was a feeling that judgments from such varied angles should yield valuable data when pooled.

Raters judged and rated the subjects according to the following description of traits. The scale is from pages 22 and 23 of the Marston Study. The starred traits are those of extroversion.

TRAITS

1	
Is self-conscious; easily embarrassed; timid or bashful.	* Is self-composed; seldom shows sign of embarrassment; perhaps is forward or bold.
2	
Avoids talking before a group; when obliged to talk before a group, finds it difficult.	* Eager to express himself before a group; likes to be heard.
3	
* Prefers group activities, work or play; not easily satisfied with individual projects.	Prefers to work and play alone; tends to avoid group activities.
4	
* Insistent upon the acceptance of his ideas and plans; argumentative and persuasive.	Not insistent upon the acceptance of his ideas and plans; agrees readily with others' wishes; compliant and yielding.
5	
Inclines toward activities requiring care; good in details; careful.	* Prefers activities demanding pep and energy, but not exacting care; perhaps is neglectful of details.

6	
Deliberative; slow in making decisions; perhaps even in minor matters, overly cautious.	* Impetuous and impulsive; may plunge into situations where forethought would have deterred him.
7	
* Keenly alive to environment, physical and social; live curiosity.	Rather indifferent to external events; tends to detachment from environment.
8	
* Self-confident and self-reliant; tends to take success for granted; strong initiative; prefers to lead.	Lacking in self-confidence and initiative; a follower.
9	
Reserved and distant except to intimate friends; does not form acquaintanceships readily.	* Hearty and cordial, even to strangers; forms acquaintanceships very easily.
10	
Tends to depression; frequently gloomy or moody.	* Tends to elation of spirits; seldom gloomy or moody.
11	
* Rather insensitive and indifferent to others' opinions; independent.	Very sensitive and easily "hurt;" reacts strongly to praise or blame.
12	
* Not given to worry or anxiety; carefree.	Worries over possible misfortunes; "crosses bridges before coming to them."
13	
Shows preference for a narrow range of intimate friends, and tends to exclude others from his association.	* Seeks broad range of friendships; not selective or exclusive in games, etc.
14	
Slow in movement; deliberative or perhaps indecisive; energy output moderate or deficient.	* Quick and decisive in movement; pronounced or excessive energy output.
15	
Shrinks from making new adjustments; prefers the habitual to the stress of reorganization required by the new.	* Adaptable to new situations; makes adjustments readily; welcomes change.
16	
* Turns from one activity to another in rapid succession; slight perseveration tendency.	Marked perseveration tendency; does not abandon an activity readily regardless of success.

17

Emotions not freely or spontaneously expressed.

* Emotions such as sympathy, delight, sorrow, anger, jealousy, etc., readily expressed.

18

Secretive; seclusive and shut-in; not inclined to talk unless spoken to.

* Frank; talkative and sociable; does not stand on ceremony.

19

* Makes the best appearance possible; inclined to "bluff" or "show off;" perhaps conceited.

Often represents himself at a disadvantage; modest and unassuming; underestimates his own abilities.

20

Does not pass quickly from elation to depression; constancy of mood.

* Frequent fluctuations of mood; tends to frequent alternations of elation and depression.

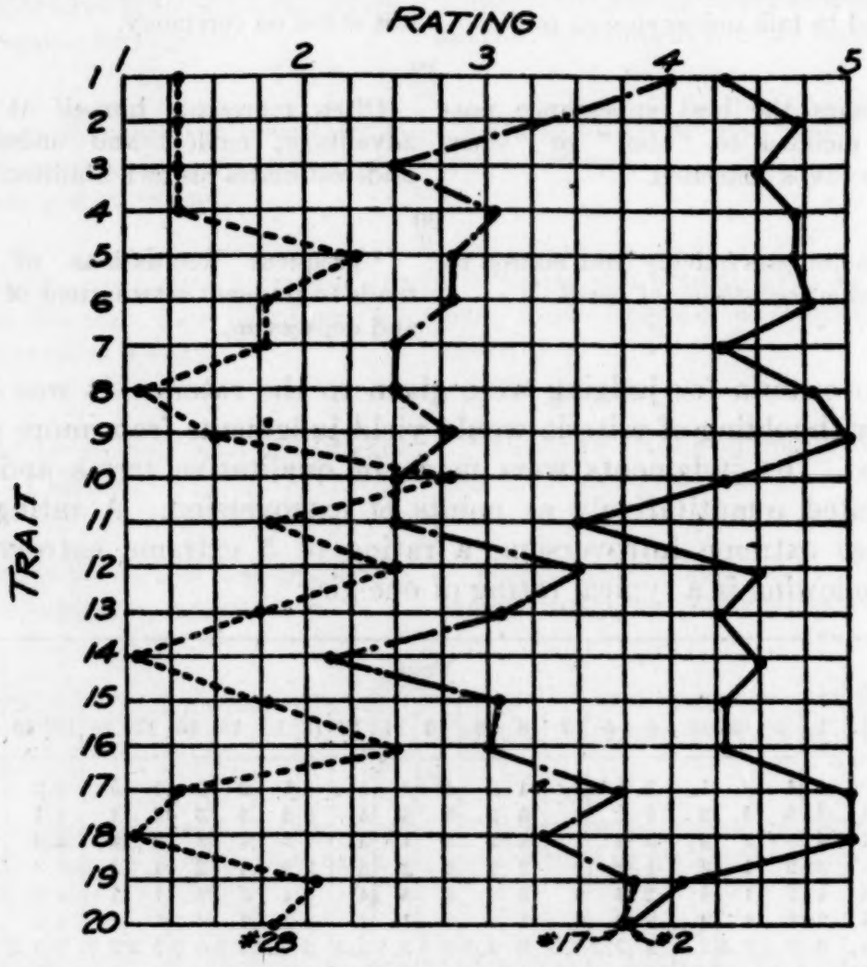
No criteria for judging were given to the raters. It was hoped that withholding of criteria would yield judgments from more varied angles. The judgments were made in qualitative terms and were translated quantitatively as points of extroversion. A rating of 1 signifies extreme introversion, a rating of 5 extreme extroversion. The following is a typical rating of one girl:

Subject	Rater	Trait																				Total	Rating
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
1	P	1	1	4	1	1	1	2	1	4	4	4	4	4	1	2	2	4	3	2	2	...	48
	B	5	5	5	2	4	2	4	5	5	5	5	5	5	5	5	5	2	4	4	1	...	83
	K	4	3	2	3	2	3	1	4	3	3	4	3	4	3	4	3	2	2	3	3	...	59
	E	2	2	2	2	1	2	2	2	2	3	2	3	2	2	4	2	4	2	2	3	...	46
	M	4	2	1	4	2	3	4	5	4	3	5	4	1	1	2	4	1	1	2	2	...	55
	H	2	2	1	2	2	2	1	1	2	2	1	4	2	2	2	4	1	1	5	2	...	41
	Av.	3	2.5	2.5	2.3	2	2.2	2.3	3	3.3	3.3	3.5	3.8	3	2.3	3.2	3.3	2.3	2.2	3	2.2	...	55.3

Subject 1 is chosen because she shows so definitely variations in introversion and extroversion as measured by these traits, under different conditions and at different occupations with different teachers. The principal has observed the girls at work with the different raters daily, and knows that the variations are not in teacher judgment, but are actual differences in reactions of the subject to different environment, different subject-matter, or to personality of the teacher. Subject 1 is rated as most extroverted by Teacher B who teaches fine handwork, and as introverted in varying degrees by the other five

raters. The girl dislikes fine handwork, but enjoys coarser handwork, and longs to be able to make up her academic deficiencies.

Profiles were made from the ratings of the girls, in each of the five groups, who were nearest the extreme introvert, the extreme extrovert, and the ambivert types. These graphs show a gradual



SUMMARY GRAPH.—Individual profile of three girls illustrating the personality traits of the introvert (subject No. 28, rating 34.8), the extrovert (subject No. 2, rating 89.5), and the ambivert (subject No. 17, rating 61).

Of the entire group of 89 girls, the profile of No. 28 is the nearest to the extreme introversion profile; the profile of No. 2 is nearest to the extreme extroversion profile; and the profile of No. 17 is nearest to the ambiversion profile.

increase in space between the profiles, as the girls have been known for a longer time to the raters. That is, there is much overlapping of the profiles in the group least known. There is no overlapping of the profiles in the group best known to the raters. The summary profiles given here show overlap at Trait 10 only.

Total average ratings of the seven most introverted and the seven most extroverted girls in the Willard School Study as compared with similar groups in the Marston Study:

	Marston	Willard	Difference
Range of ratings, introvert	31–41	34.8–40	
Range of ratings, extrovert	83–87	83.3–89.5	
Total average, introvert	37	37.6	0.6
Total average, extrovert	87	86.5	0.5
Total difference between averages, introvert and extrovert	50	48.9	1.1

Since of this 1.1 points of difference, the Willard School Study shows 0.6 above the Marston in average introversion, and 0.5 below the Marston in average extroversion, the final difference between the two studies in terms of balance of introversion against extroversion as shown by the ratings of these traits is 0.1 on the introversion side. Accordingly, the average profiles of the seven girls rated as most introverted, and of the seven girls rated as most extroverted, are within 0.1 of being identical with those of Marston.

The distribution of the total rating scores of the 89 girls of the Willard School Study follows rather closely the normal curve of distribution.

Graphs made from the distributions of 3000 ratings on traits of the 25 girls best known to all of the raters, show bi-modal tendency away from the center as in the Marston graphs, for the groups of girls engaged in academic work, weaving and embroidery, music and social activity, and drawing and cardboard construction work. The graphs for the dressmaking and millinery, and cooking and housekeeping groups follow the normal curve of distribution.

Some facts which appear from the study:

1. A girl may be introverted, apparently, on these traits according to the judgments of five teachers, and may be the exact opposite with the sixth teacher. An average judgment is fairer to the girl than any one judgment.

2. Environment, subject-matter and teacher personality have important bearings upon introversion and extroversion as rated in this study.

The rooms in which the girls seem most introverted are the ones in which the finest handwork or the most intense application is required.

The introverts are less introverted in cooking and dress-making classes. The extroverts are less extroverted in the highest class where

there is more group feeling, and where pupil initiative and pupil responsibility are most developed.

Girls rated at school as introverts, are known to be extroverted at home, on the street, or with different companions. Sex may have much to do with apparent changes from introversion to extroversion.

3. The teacher raters, most faithful to their scientific attitude, have learned as they judged.

Accomplishment of the Purpose of the Study

1. The scale has a practical value as a measuring instrument of introversion-extroversion traits of the Francis E. Willard School girls, in that it yields ratings which do indicate the course of remedial treatment.

2. The data show that these girls are inclined 0.1 of a point more towards tendencies towards introversion than the younger, more socially promising group of the Marston Study.

Question.—Do these results indicate, as they are placed over against Marston's results in almost perfect correlation, that Intelligence Quotient and Social Status may have no bearing upon tendencies towards introversion-extroversion as outlined in these 20 traits?

STATISTICS SHOW——

HARVEY C. LEHMAN
Ohio University
AND
PAUL A. WITTY
The University of Kansas

Educators are harassed constantly with problems resulting from statistical endeavor. With many of the formulæ employed they are unfamiliar. To some, the mere utilization of obscure and intricate formulæ, signifies profundity of thought. Many are inclined to accept with little discrimination the conclusions based upon faulty statistical procedure. In recent years, the use of statistics has been paralleled only by the misuse of statistics. The conclusions drawn from statistical treatment of data are many times unwarranted. The spurious conclusions are accepted unhesitatingly however by the uncritical; the statistical treatment giving *prima facia* evidence of validity. A cloak of respectability thus often envelops shoddy mathematics and unwarranted procedures. Indeed, the mania for employing statistics has so seized the pedagogical world that few theses are now written by candidates for the master's degree in education that do not employ statistics. The emphasis placed upon statistics is well illustrated by the following facts:

Of 204 doctors' dissertations published during the past 20 years by Columbia University as Teachers College Contributions to Education, 65 per cent employ statistics and only 24 per cent employ foreign languages in securing data.[1] The following table discloses the present trend toward increased utilization of statistics in educational endeavor.

TABLE I.—PERCENTAGES OF DOCTORS' DISSERTATIONS PUBLISHED AS TEACHERS COLLEGE CONTRIBUTIONS TO EDUCATION, AND EMPLOYING STATISTICS AS THE TOOL OF INVESTIGATION[2]

YEARS	PER CENT
1905–1915	41
1916–1926	78

The above data show that approximately four out of every five Teachers College dissertations employ statistics *now*. The masters' theses being written in the Department of Education of the University of Kansas at the present time almost invariably employ statistical devices to some degree. It is likely that the present situation in the University of Kansas is not unique in this regard. Moreover, most of

the papers presented at state and national educational meetings are of a statistical nature.

It is apparent, therefore, that there is a widespread *demand* for the use of statistical devices. Ability and training in *use* of statistics have not paralleled the demand. Statistical fallacies fill the pages of current periodicals. Sometimes this is due to the fact that involved formulæ are employed. Sometimes the fallacies have little justification whatsoever. The errors attendant upon the current use of statistics are occasioned by the following facts: (1) The workers often have had far too little training in the use of statistics. (2) Authorities are by no means agreed upon procedures to be followed or upon the interpretation of data. (3) Difficulties arise in interpretation of data due to failure of the worker to take an objective position and view the data impartially. Statistics must be interpreted; they mean nothing until interpreted. In view of this fact, it appears to the present writers that one may demand something approaching objectivity on the part of the worker. In many instances, statistics are used merely to validate hurried generalizations and to lend respectability to rationalizations. Not infrequently conflicting and diametrically opposed interpretations are placed upon similar data.

Interpretations Diametrically Opposed

Thus Brigham in an analysis of scores made by foreign-born recruits in the United States army noted that the most recent immigrants made lower scores than earlier immigrants, and concluded that the more recent immigrants were less intelligent than those who came to America at an earlier date.[3] Various critics have pointed to the language handicap of the recent immigrants and have interpreted Brigham's finding merely as an indictment of the tests which purport to measure intelligence.

Bagley offers still another interpretation.

> Recent immigration has come most largely from countries where school facilities are relatively meager—most recently from countries that are very backward educationally; hence the gradual decrease in the Beta scores as we reach the more recently arrived immigrant-groups can be explained with a thorough-going consistency by reference to the educational factor.[4]

Other conflicting interpretations of a given set of data are as follows:

> Two investigators, apparently working quite independently of each another, have discovered that much of the experimental evidence used to support the theory that equal training increased individual differences is open to quite the opposite interpretation.

H. B. Reed,* reporting in 1924, took the data cited by Thorndike, Henmon, Starch, and others in substantiation of this theory and showed that merely changing the method of measuring improvement reversed the evidence of most of the experiments. Consider, for example, a simple case: At the beginning of a learning-experiment, a quick learner can solve (say) five problems an hour involving certain arithmetical operations new to him; a slow learner under the same conditions can solve (say) two problems; the difference in initial efficiency between the two learners, then, is three problems an hour. At the end of the period of training, assume that the quick learner can solve 25 problems an hour, and the slow learner 15; the difference in terminal efficiency between the two learners is 10 problems. Measured in this way, equal training seems clearly to have *increased* individual differences. But change the method of comparison: At the outset, the slow learner had only two-fifths or 40 per cent of the quick learner's efficiency; at the end of the period of equal training, he has fifteen twenty-fifths or 60 per cent of the quick learner's efficiency. Is it not equally clear that the difference between the two has been decreased by the training?[5]

Errors Due to Failure to Consider All Pertinent Data

The Report of the Classical Investigation Conducted by the Advisory Committee of the American Classical League informs the unwary reader that more pupils are studying Latin today than ever before in history.[6] A recent editorial in the *School Review* points to the inaccuracy of the impression left with reader.

One frequently gets a distorted notion of the tendencies in high-school education from figures which give the total number of pupils taking a given subject. For example, the country has been informed in recent months that Latin is a subject which is flourishing in the secondary schools. The basis for this statement is the fact that larger numbers of pupils are studying Latin now than formerly. Such statistics overlook entirely the fundamental fact that the total number of pupils attending the high school is increasing so rapidly that a given subject may be taken by more pupils and yet be relatively very much less important than it was at earlier periods.[7]

It is true that more pupils are studying Latin in American high schools than ever before but the *percentage* of high school pupils who are studying is rapidly decreasing. Ignoring the absolute figures and referring to percentages only the following situation is found:

Table II.—The Decreasing Percentage of High School Pupils Studying Latin[8]

Year	Percentage Studying Latin
1900	50
1905	50
1910	49.05
1915	37.32
1922	27.52

* Reed, H. B.: *Journal of Experimental Psychology*, Vol. VII, No. 3, June, 1924, pp. 186ff.

Such inexcusable failure to weigh all pertinent data and to interpret them is encountered frequently. The following paragraph seems to show that the writer's wish determines his interpretation.

A Priori Reasoning

Another project entered upon by the Institute of Educational Research in its first year was an inquiry into the effects of the study of Latin upon the range of English vocabulary and upon logic and carefulness in reading English . . . This work was a part of the Classical League Investigation. The findings of the study are secure, although they have been given an unwarranted interpretation in the report of the Classical Investigation. Although the Classical Investigation Report drew conclusions from these and similar studies as to the validity of the study of Latin, Dr. Thorndike's studies do not support such conclusions.[9]

Important procedures are sometimes recommended dogmatically without complete or adequate treatment of available data. Thus Baldwin has proposed physiological maturity as a major index for selecting and classifying school children. Baldwin's proposal is based upon the fact that in a heterogeneous group of school children, he found a high positive correlation between physiological age and mental age.[10] However, when children are treated in homogeneous age groups, high correlation is not demonstrated. The above proposal of Baldwin is therefore unwarranted. Indeed, Gates has shown that, when the factor of chronological age is eliminated, physiological age as measured by the development of the wrist bones yields a coefficient of correlation with mental age so low as to make this measurement of doubtful value for classification.

Mere physical status or maturity, then, however adequately measured, apparently does by no means gauge mental, educational, social or emotional maturity satisfactorily. Classification of pupils alike in general physical status will not result in a satisfactory classification on any other basis. They will be alike physically provided enough physical measurements are made, but they may be quite unlike in mental age, in mental, social, scholastic and emotional maturity.[11]

Statistical Nonsense

Generalization based upon questionable statistical procedure is illustrated in the following:

Dr. Burt, the London psychologist, thought he had proved statistically that a child's mental age is attributable to training much more than to endowment. Holzinger and Freeman show that by applying Burt's statistical methods to his own data it is possible to prove that a child's *chronological age* is also largely attributable to training; in other words, Burt's alleged proof is statistical nonsense.[12]

In a recent article, S. A. Courtis describes an attempt "to determine whether attendance at Sunday School produces in the boy who

goes as compared with the boy who does not go, a distinctive effect over and above the effects of the general indirect influence of religion to which both are subject."[13] As a result of his study Courtis draws the following rather startling conclusions:

> . . . the effect of Sunday-school attendance upon children coming from religious homes is to raise their Stanford (Achievement) scores approximately 5 per cent of the total value.[14]
>
> . . . a child with an IQ of 100 plus religious influences would make the same (Stanford Achievement) score as a child with an IQ of 115 without the benefit of religion, age and training being the same for the two boys.[15]

Certainly, validation of the above hypotheses are needed before generalization is justified.

Other Doubtful Conclusions

Courtis has arrived also at certain other questionable conclusions.

> Children succeed in their school work in general accordance with their development or maturity. The level of their development at any age is fixed by hereditary factors which are measured roughly by the intelligence tests, while the training contributes a small but distinctive amount in addition. These factors account for 90 per cent of the changes in children.[16]
>
> The standard deviation of the changes in the Stanford scores on a retest after an interval of two days was a little under 7 per cent of the mean score. This suggests that all the remaining factors which influence a child's score have a combined *general* effect which is not more than 3 per cent of the total scores . . .[17]
>
> Three per cent represents the combined distinctive effect of all other factors such as teaching ability, social status, emotional control, home influence, etc.[18]

In commenting upon Courtis' treatment of his data Miss Burks makes the following remarks:

> The author's treatment of data, however, has not yielded results which can be applied to the nature-nurture problem with precision. It is not clear why standard errors of estimate have been divided by the mean in order to get percentage contributions. But it is clear that if we should go one step further in applying this technique, we should get a result something like the following: The standard error of estimate of score on the Stanford Achievement Test predicted from age, intelligence, and training is 5.46 score points, or only 10 per cent of the mean score. Consequently these three factors contribute 90 per cent to deviations on the Stanford Achievement Test. Now the limit of the standard error of estimate of the Stanford Test predicted from variables whose correlation with it approaches zero cannot possibly be greater than the total standard deviation of the test. The total standard deviation for the children tested by Dr. Courtis is 13.24, or only 24 per cent of the mean score. Accordingly, all the factors entering into this prediction contribute not less than 100 per cent minus 24 per cent, or not less than 76 per cent of pupil deviations. Add this to the 90 per cent contributed by age, intelligence and training, and our pupil deviations surpass imagination.[19]

Such a conclusion as that of Courtis is of extreme importance to the conscientious educator. Burk's statement suggests that Courtis' data do not warrant such a conclusion. The writers do not pretend to be competent to say which of these statisticians has taken the more valid position. However, important generalizations certainly need verification before being submitted to the public as verified facts.

Obsolete Data

There is danger in the use of figures based upon investigations in which past generations have been used as subjects. The case of Burk's investigation of the extent to which children collect and hoard is in point. The investigation of C. F. Burk is cited by practically all present-day educational psychologists. Burk's investigation was made in 1900. The present writers have found that children *now* engage much less frequently in this activity than in 1900.[20] According to Burk's data, 90 per cent of the boys and 91 per cent of the girls studied were actively making collections at the time of her investigation. The present writers found barely 10 per cent of children of either sex doing so at the present time. It is important therefore to consider *when* as well as *how* a given set of data are obtained. Writers are sometimes careless in reference to these very important items.

Difficulties Encountered in Interpretation of Data

Practically all writers on measurement in education emphasize the importance of utilizing the correlation technique. But what do coefficients of correlation mean? H. C. Hines makes the statement that an r of $+.60$ is high.[22] Ruch, on the other hand, criticizes this statement by asserting that the prediction made from an r equal to $+.60$ *is but* 20 *per cent better than a zero correlation.*[21]

Hines after spending most of a chapter upon statement of how to secure coefficients of correlation states:

> Usually a correlation is said to be negligible when it is less than .20; low when it is between .20 and .40; marked when it falls between .40 and .60; and high when it is above .60. In the problem just solved ($r = .75$) the correlation may be said to be high. It is a positive correlation; this, together with the fact that it is high indicates that, so far as this group of pupils is concerned, ability in language and ability in composition tend to vary together.[22]

The above quotation includes all the *pertinent* facts given by Hines in regard to interpretation of correlation indices. The writers have observed the confusion of many sincere teachers who have assimilated all the material *given* in such books and who have failed

to see the significance of applying correlation in their classroom enterprise. What do *high, low* and *marked* coefficients of correlation mean? Certainly, if the arduous task of mastering formulæ is justified, the interpretation of the secured data must follow in order that significance may be appreciated. Merely to inform the teacher that two abilities "tend to vary together" doesn't suffice.

Briggs has shown[23] that, according to statistics: (1) there was a negative correlation of −.511 between the percentages of pupils studying Latin in the high schools of the several states and the educational efficiency of these states as estimated by Ayres. (2) The correlation between the native population in 26 states and the army Alpha intelligence scores of the recruits from these states was −.597. (3) The correlation between percentages of individuals from the several states in *Who's Who in America* and the frequency of Latin study was −.812. (4) The correlation between the birth states of native born Federal prisoners and frequency of Latin study was .026. (5) The correlation between percentages of individuals studying Latin in the various states and the homicides committed in the several states was .789.

The above findings of Briggs were statistically secured but it is exceedingly difficult to arrive at a plausible analysis of them. It is easy enough to say that Briggs' last finding indicates that the study of Latin in the various states and the number of homicides committed in the various states "tend to vary together." But does this mean that a change in the percentages of individuals studying Latin in the several states would result in a change of the number of homicides committed in the several states? Such an inference would of course be ridiculous. In other words, it is not correct to say that a high positive *r* between two variables posits that the two tend to *vary* together. It means merely that they have been found to coexist.

The difficulties attendant upon interpretation of data are well illustrated in the following. As Bagley has shown, four interpretations are possible for a high positive correlation.

> . . . the fact that the American states vary in their present-day levels of intelligence and efficiency directly as they have varied in their past provisions for mass-education is not in itself proof of a causal relationship between good schools on the one hand and intelligence and efficiency on the other hand. At least four hypotheses may be advanced to explain the observed facts: (1) The direct relationship may be purely accidental; (2) good schools may be the cause of intelligence and efficiency; (3) intelligence and efficiency may be the cause of good schools; (4) good schools, intelligence, and efficiency may all be the results of other causal factors which do not appear in the relationships observed.[24]

Further Remarks

The writers have commented upon the loose and unjustifiable use of statistics in various periodicals. Individuals are conspicuously more careful when writing than when speaking. What must be the cumulative errors attendant upon classroom *lecture* methods when statistical data are lectured about? Statistical verification is impressive and sometimes desirable. The present writers have observed several well-known instructors (1) arguing *causation* from correlation (2) misquoting statistics to bolster up questionable statements.

Collectively, the above findings show that the misuses of statistics are manifold. The student of education should therefore regard critically conclusions that are based upon statistical studies. He should realize that the present-day attitude of ready acceptance of statistical results is not likely to survive unmodified. It was stated long since that the only permanent phenomenon is that of eternal change. Nowhere is this fact better illustrated than in the field of education. The history of education has been a history of the rise and fall of educational movements. Nothing is more certain than the fact that many current educational doctrines will be thrown into discard. The misuse of statistics pictured above cannot go on indefinitely.

The present writers are not attacking the *science of statistical procedure*. The title of the present paper was selected for the purpose of emphasizing the fact that statistics can never show anything unless initial assumptions are accepted at the outset. The student of education is apt to overlook the fact that mathematics, as a science, concerns itself solely with the conclusions which necessarily follow by logical inference from a set of assumptions. Thus, the traditional Euclidean geometry can be developed from 12 assumptions and two undefined terms. The mathematician does not consider any of these assumptions to be absolute truths. He does not claim to be able to discern absolute truth. What he does claim is that mathematicians have established (with as great certainty as is possible at the present stage of human development) a great body of relations (or theorems) which must be accepted as valid if the assumptions are to be accepted. In other words, in any life situation where all of the Euclidean assumptions can be shown to apply, the mathematician will guarantee that all of the theorems of Euclidean geometry apply.

The mathematician may be quite unconcerned with the truth or falsity of his assumptions. He may be concerned wholly with their logical implications. Practically, if the mathematician is to produce

a valuable system, he must select assumptions which apply to conditions which are met with in human affairs. He therefore frequently concerns himself to some extent with applications of his science to physics, chemistry, astronomy, and other fields of human knowledge, but he does so merely to illustrate the usefulness of his science and not as any necessary part of the science itself.

In the treatment of data the student of psychology or of education frequently overlooks the fact that if his conclusions are to be inescapable conclusions, like those of the mathematician, he must examine the validity of his initial assumptions. If mathematical formulæ or other mathematical results are to be used in the treatment of data, it must be shown that the assumptions under which the mathematical formulæ or other mathematical results were developed apply to the specific situation. This is a consideration which is often entirely neglected or partially considered.

Rigorously accurate mathematical procedure proves nothing unless initial assumptions are valid. Too frequently initial assumptions are not even formulated, and conclusions are therefore contingent rather than inescapable.

As a corrective for the present situation the enthusiastic statistician would recommend, of course, redoubled zeal in the study of statistics. The writers would recommend less ready acceptance of conclusions, based upon involved statistics, by students of education. They feel that the only scholarly attitude toward many conclusions so secured must be that of suspended judgment. However, attention must be directed *by experts* to the improvement of tools of research and their application.

Summary

1. There is an increasing demand for the employment of statistics as the tool of educational investigation.

2. Conflicting and diametrically opposed interpretations are sometimes placed upon the same data.

3. In many instances errors arise from failure to consider all pertinent data.

4. Expert statisticians are able to show that other expert statisticians are indulging in "statistical nonsense."

5. It is obvious that the misuse of statistics is by no means rare.

6. Provisional interpretations of correlation are often of doubtful value to the classroom teacher.

7. The only scholarly attitude to be taken by the novice, *i.e.*, by most of us, toward conclusions based upon the more involved statisti-

cal formulæ must be that of suspended judgment. Another statistical expert may show the conclusions to be fallacious.

References

1. Bay, James C.: Tools of Research Needed in the Preparation of Dissertations for the Doctorate in Education. *School and Society*, Jan. 8, 1927, pp. 53f.
2. *Ibid.*, p. 54.
3. Brigham, Carl C.: "A Study of American Intelligence." Princeton, N. J.; Princeton University Press, 1923, pp. XXV + 210.
4. Bagley, William C.: "Determinism in Education." Baltimore, Warwick and York, 1925, 194 pp. (p. 121).
5. Bagley, William C.: *Op. cit.*, p. 153.
6. The Classical Investigation Conducted by the Advisory Committee of the American Classical League. Part One. Princeton, N. J., Princeton University Press, 1924, p. 18ff.
7. Editorial: *School Review*, Jan., 1925, p. 2f.
8. "Statistics of Public High Schools. 1921–22." *Bureau of Education Bulletin* No. 7, 1924.
9. Symonds, Percival: *Teachers College Record*, Feb., 1926, Vol. XXVII, No. 6, p. 571.
10. Baldwin, Bird T.: "The Physical Growth of Children from Birth to Maturity." University of Iowa Studies, Vol. 1, No. 1, 1921.
11. Gates, Arthur I.: The Nature and Educational Significance of Physical Status and of Mental, Physiological, Social and Emotional Maturity. *The Journal of Educational Psychology*, Sept., 1924, Vol. XV, No. 6, pp. 329–358 (p. 352).
12. Editorial: The Possibilities and Limitations of Training. *Journal of Educational Research*, May, 1926, p. 371.
13. Courtis, S. A.: The Influence of Certain Social Factors upon Scores in the Stanford Achievement Tests. *Journal of Educational Research*, June, 1926, pp. 33–43.
14. Courtis, S. A.: *Op. cit.*, p. 36.
15. Courtis, S. A.: *Op. cit.*, p. 37.
16. Courtis, S. A.: "Why Children Succeed." Detroit, Friesema Brothers Press, 1925, p. 194.
17. Courtis, S. A.: *Ibid.*, p. 192.
18. Courtis, S. A.: *Ibid.*, p. 202.
19. Burks, Barbara Stoddard: Review of Courtis' Dissertation on *Why Children Succeed*. *Journal of Educational Research*, May, 1926, p. 383f.
20. Lehman, Harvey C. and Witty, Paul A.: The Present Status of the Tendency to Collect and Hoard. *Psychological Review*, Vol. XXXIV, No. 1, Jan., 1927, pp. 48–56.
21. Ruch, G. M.: Book Review. *Elementary School Journal*, Sept., 1923, p. 71.
22. Hines, H. C.: A Guide to Educational Measurement. Boston, Houghton Mifflin Co., 1923, pp. XXII + 270 (p. 39).
23. Briggs, Thomas H.: Latin and the Statistical Method. *School and Society*, Vol. XXI, No. 2, Jan. 10, 1925, pp. 51–52.
24. Bagley, William C.: *Op. cit.*, p. 161.

SOME RESULTS OF TEACHING BEGINNERS BY THE LOOK-AND-SAY METHOD

R. M. MOSHER

Superintendent of Training School, State Normal School, New Haven, Connecticut

The Problem

The present study is an attempt to gather data on the effectiveness of the look-and-say method in teaching beginning reading. Among studies which have attacked this problem, those of Valentine, Dumville and Winch experimental and control groups have existed, the results appearing in a manner which makes comparisons between two methods possible. In this study no such comparison is possible. The data give, simply, the achievement of a class at the close of the first year.

Specifically, the problem of the present study is: What is the utility of the look-and-say method in teaching young children to read.

Look-and-say Method Defined

Teaching reading so that the pupil immediately attaches meaning to the written symbols (words) has been designated as the "look-and-say" method. The instructional procedure is one in which the pupil reacts to a word, or group of words, as a unit. Analytical means for aiding in the correct response are discouraged, *i.e.*, selecting and trying in order the characteristic consonant and vowel sounds, one by one, discarding each until the desired or correct one is finally hit upon. In contrast to the analytical procedure, reading, if it be effective and economical is regarded as perceiving; it is the observation of the printed symbol and the thinking of the thing for which the symbol stands. In view of what has been said, there are obvious implications that helping devices, such as the study of the phonetic qualities of vowels and consonants, phonograms, etc., are not employed at any time in the truly "look-and-say" attack as defined in this article.

Look-and-say vs. Phonetic Method

During the past few years phonetics have been utilized by thousands of teachers of beginning reading. Many research workers in reading, as well as those who have devoted time and thought to the

teaching of the subject, have advocated the utilization of such analytical procedures on the ground that pupil-independence resulted.

Quantitative evidence, the nature of which would prove that phonetics are superior in their effectiveness, has never appeared for a sufficiently large pupil-population to be convincing. In fact, the utility of phonetics has been seriously questioned by some investigators as to its desirability as one of the first steps in learning to read, in that it is believed to be the cause of many undesirable reading habits, observable early in the pupil's educational career.

In the matter of reading habits it is well to recall that the most important aim of reading should be the preparation of the pupil to read silently, with a maximum of efficiency and economy. Oral reading has its place but is acknowledged to be entirely secondary, except in the lower grades. In order to accomplish the primary aim of reading, it is necessary to organize reading situations and the accompanying activities in such a way that all will be useful. A principle of learning which is easy to accept is: That bonds should be formed and exercised in the way in which they will be used. If teachers wish to accomplish the goal of efficient and economical silent reading, a method which has as its first principle the formation of desirable reading habits, such as rapidly moving the eye across the page, thereby reacting to larger visual units, appeals strongly since it makes for much less waste of time. If analytical habits, which seek to aid in the pronunciation of each element of a word, are inculcated from the first, it is safe to assume that habits of careful analysis will persist, unless severe means are later employed to overcome these tendencies. If the principle of primacy in learning has merit, the initial bonds in reading should be of the type which further the ultimate goal. From the beginning, therefore, greater emphasis should be placed on the formation of bonds which will not be discarded later, but which will be serviceable in hierarchies facilitating the more remote aspects of the subject.

Those who advocate phonetics as a means for preparing pupils to help themselves in reading do so in spite of the unanimity of agreement that English is not a truly phonetic language.[1] Almost every vowel has certain and peculiar qualities of sound which, when combined with given letters, make for a particular utterance. The consonants,

[1] *Cf.* Gates, A. I.: "Problems in Beginning Reading." Teachers College Record, Vol. XXVI, No. 27, p. 579.

too, may be hard or soft in sound, depending on the other letters of the word. The wide range of possibility in vocal utterance leads to a trial and error procedure on the part of pupils.

Then, again, it is difficult to ascertain to what extent pupils actually use phonetic training in reading situations. Those who advocate phonetics claim that it is a means of preparing pupils to help themselves in reading. However, teachers have testified that many pupils must be urged to employ the training in phonetics in attacking words which cause trouble. The assumption that intelligent drill in phonetics develops reading abilities in seeing likeness and difference in words is not always justified by the observation of many first-grade teachers.

The Subjects

Twenty-six children in Grade I of the Demonstration School, New Haven State Normal School, took part in the present experiment. There were no selective factors involved except those involved in any public school classroom. A rather large proportion of the group came from homes other than American, but in no case was there a language difficulty of any magnitude. The chronological ages ranged from five years through eight years, the mode, at the close of the school year, being around seven. The general mental level of each pupil was determined by the scores derived from the application of the Detroit First Grade Intelligence Test.

The Teaching Procedure

The children began their reading by developing four-sentence themes about school, home, or life experiences which the teacher wrote on the blackboard. The vocabulary and organization was that of the children entirely, no attempt being made to guide or direct the usage of words toward the particular vocabulary of a textbook. Upon the completion of the theme each pupil read the sentences orally. At this early period, the teacher urged the pupil to carry the eye across the page and sweep back quickly to the initial word (or words) of the succeeding sentence. The initiation of the correct reading habits as they pertain to eye movements was begun with the first lesson and gradually established as work progressed.

From day to day, new themes were developed. The vocabulary increased gradually and test devices were applied to measure actual

word recognition. By combining and re-combining certain words and phrases, the pupils were checked on their achievement in recognizing words and incidentally forced into a position of having to react to certain words hitherto unlearned as essential reading elements. Informal tests of the "true-false," "yes and no," "draw a picture" type were utilized to check on comprehension and general achievement in silent reading.

When the pupils had been exposed to a reading vocabulary of 400 words or thereabouts, primers were introduced. The transition was easy and marked by no undue ceremony or special preparation for the new step. The pupils, having been habituated to the idea of thought-getting and other fundamental reading aims, proceeded to make the transition to the printed page of a book with marked pleasure and satisfaction.

With books in the hands of the pupils, increasing the reading vocabulary came through meeting new words in the stories and having them pronounced by the teacher. In this way, the story-getting element was foremost, and in no case was a pupil urged to guess at a difficult or unusual word. Since repetition of the keywords is an essential element in the organization of primer reading material, the chance for testing retention was great. Certain words appear and reappear many times within a story. Meeting these words in many new contexts is the best possible method of drilling.

Just as soon as one primer was finished another was taken. The emphasis was put on reading many books. Therefore, silent reading played an important part in the daily lesson, and as the year went on, more and more stress was put upon it.

To summarize, it might be well to indicate that the following principles were observed in the teaching procedure: (1) From the initial stages, bonds were formed as they were expected to function; (2) from the beginning, bonds were formed that would be serviceable; (3) no analytical devices of any kind were employed which might destroy the rate of speed or act as a deterrent to the drive toward the thought-getting.

Vocabulary Achievement

Pre-book Stage.—A record of the pre-book words was kept, the result of showing a total vacabulary of 444 words. Table I shows the total number of words used in the pre-book stage and the frequency of usage for each of the divisions arranged in the Thorndike Word Book.

TABLE I[1]

WORD-CLASS ACCORDING TO THORNDIKE WORD LIST	NUMBER OF DIFFERENT WORDS	TOTAL OCCURRENCE
1A1	72	653
1A2	42	125
1A3	35	139
1A4	28	85
1A5	34	59
1B	89	175
2A	37	51
2B	32	57
3A	18	22
3B	7	15
4A	10	21
4B	5	10
5A	4	8
5B	9	19
5000	22	55
	444	1494

[1] The writer is indebted to Miss Iva Mercer, demonstration teacher in Grade I, State Normal School, New Haven, for the great assistance in tabulating the data in the tables of this study.

From the above table, it is obvious that the more important words, using the Thorndike Word List as a criterion, were introduced in the themes of the pre-book stage. In the 1A1 Word-class, 72 words were utilized in the reading materials which the children created themselves. It seems safe, therefore, to assume that children will prepare themselves for book-reading if given an opportunity to initiate certain activities. Undue pressure, on the part of the teacher, for the selection of *certain* words for pre-book reading because of their presence in a book, is useless and entirely unnecessary, if these data are indicative of what other children might do.

In Table II, the 1A1 words are divided as used by the "rapid," "average," and "slow" sections of the grade. The numbers in the columns indicate the frequency of repetition in different reading themes.

Tests of individual pupils were not applied to ascertain the actual number of words learned. The tabulations indicate merely what words were encountered and the frequency of their appearance in different themes. The number of repetitions listed does not take into account the many times the same words were used in informal tests, seat-work, reading from *library* books, etc. It seems safe to assume that if pupils are permitted to initiate the materials which are to be

TABLE II.—THEME VOCABULARY

1A1	A	B	C	Total
1. about	2	..	..	2
2. all	5	1	..	6
3. an	1	1	..	2
4. and	7	8	4	19
5. are	8	5	13	26
6. as	..	..	2	2
7. at	..	2	3	5
8. be	3	4	..	7
9. by	3	..	..	3
10. can	1	..	..	1
11. come	11	5	2	18
12. day	3	2	1	6
13. do	..	2	..	2
14. every	..	1	1	2
15. for	2	6	1	9
16. from	1	1	1	3
17. go	5	6	4	15
18. good	2	3	3	8
19. had	5	3	4	12
20. have	2	5	8	15
21. he	6	3	5	14
22. her	..	..	2	2
23. him	2	..	..	2
24. his	6	5	2	13
25. if	1	..	..	1
26. in	10	8	8	26
27. is	10	9	17	36
28. it	4	2	4	10
29. know	..	1	..	1
30. like	4	2	7	13
31. long	..	..	1	1
32. make	4	4	..	8
33. man	2	3	..	5
34. my	..	3	4	7
35. new	1	4	2	7
36. not	1	2	..	3
37. now	..	2	..	2
38. of	9	3	2	14
39. old	1	..	2	3
40. on	6	5	4	15
41. one	..	2	..	2
42. or	..	1	..	1
43. other	1	..	..	1
44. our	12	11	12	35
45. out	3	..	2	5
46. over	..	..	1	1
47. see	..	..	2	2
48. some	5	4	5	14
49. take	..	1	..	1
50. their	1	5	3	9
51. them	1	..	..	1
52. then	5	..	1	6
53. there	8	4	4	16
54. they	2	7	8	17
55. things	..	..	1	1
56. this	4	4	4	12
57. time	1	3	..	4
58. to	16	13	12	41
59. two	2	..	..	2
60. up	4	2	1	7
61. very	..	1	..	1
62. was	7	10	..	17
63. we	36	12	26	74
64. were	4	1	2	7
65. what	..	2	1	3
66. when	2	1	..	3
67. who	..	1	..	1
68. will	1	2	..	3
69. with	1	2	6	9
70. work	..	..	2	2
71. years	1	..	..	1
72. little	2	1	5	8
	247	201	205	653

read, the vocabulary used will be in great part those important words which will be met in worth-while primers and first readers.

Book-stage.—The direct method of teaching described above was carried out when books were used. The pupils were urged to read to get the thought, sometimes orally and sometimes silently. The procedure when new words were encountered was simply that of the teacher pronouncing and the pupil fitting the new word into the sentence and proceeding. Retention and fixation were the result of meeting words in many new contexts. In this way, the pupil was constantly meeting a reading situation which challenged him.

In order to measure the probable achievement of reading vocabulary for Year I, a count was made of the words in the first nine books. Table III shows the number of new words introduced by each book. For example, the Everyday Classics (primer) introduced 281 words; the Free and Treadwell Primer introduced 105 new words which were not found in the Everyday Classics Primer, etc. Since the books were read in the order indicated, the number of new words to be encountered was definitely known; and in general what the difficulty of each successive book would be in terms of new vocabulary.

TABLE III.—BOOKS GIVEN IN THE ORDER IN WHICH THEY WERE READ. FIGURES INDICATE NUMBER OF WORDS NOT APPEARING IN THE PREVIOUS BOOKS READ

1. Everyday Classics (Baker & Taylor) Primer vocabulary	281
2. Free and Treadwell Primer	105
3. Fun Book—LaRue	213
4. Winston Primer "Companion"	80
5. The Old Woman and Her Pig	13
6. Under the Story Tree—LaRue	196
7. Progressive Road to Reading—Bk. I	125
8. Free and Treadwell First Reader	256
9. Everyday Classics—First Reader	192
	1461

In all, a possible total of 1461 words as involved in the nine books, all of which were read by the "A" class. The "B" class read five books, and the "C" class two books, giving total vocabularies of 692 and 386 respectively.

A random sampling of words was selected for testing purposes. For the "A" class 401 words, the "B" class 185, and the "C" class 67 words.

Table IV gives the results for the three sections of the grade when the test words were presented on flash cards and in sentences.

TABLE IV

	Flash Cards	Content
Average for A group	1098	1254
Average for B group	307	421
Average for C group	50	63

In studying the above table, an interesting outcome of the study appears in the fact that more test words were recognized in context than in isolated form. Since the method of teaching the children to read adhered strictly to the idea "reading bonds should be formed and exercised as they will be used," such an outcome was hoped for and expected. To give drill, therefore, on word lists, which is the practice of many first grade teachers, would seem to be unnecessary loss of time, since the data here presented indicate significant achievement when the test words are presented in context.

To ascertain accurately the cause of the low scores for each pupil in the "C" class, would greatly amplify the results. In general the intelligence level of this group was low and in a rather striking manner the nature and number of study habits corresponded to the lack of mentality. Interest and enthusiasm in matters pertaining to the activities of the school were noticeably absent.

Since the purpose of this study is to discover the usefulness of the look-and-say method, it was deemed inadvisable to introduce *remedial* measures for the slow children which would involve use of phonetics or other analytic devices. It would be difficult to say what would have been the result if such means had been employed. The aim of the experiment precluded the possibility of a wide-open field of remedial work. On the other hand, it might be argued that almost every typical first grade has its "C" class and, in many instances, the achievement of the children in this group is little. To have the actual achievement in this group revealed in quantitative terms comes as somewhat of a shock to a teacher who has worked faithfully for a year with her pupils.

Advocates of the phonetic method claim that the pupil is equipped with a technique for meeting new reading situations which renders him independent. However, the extent to which this technique is used has been seriously questioned by many educators. In this connection it is well to point out that the look-and-say method makes no claim for the development of a *special* technique for meeting new situations apart from an attitude of thought-getting. Just what happens when a child meets an entirely new word is difficult to say, but the loss of time in figuring it out seems to be reduced to a minimum.

The testimony of the pupils was somewhat as follows: "If I don't know a word, I look at the next word or the one before. If I can't get it then, I read the whole sentence skipping it. If I can't get it then I look at the picture, then I study the word carefully." The last step comes more closely to the analytical one of seeking the inherent clues than any, but is utilized only as a last resort.

The results indicate the fact that the vocabulary accomplishment of the entire group varies from scores approaching zero up to 1455 words, for different pupils. No attempt was made in this study to test the possible upper limits of accomplishment. The test data, based on the vocabulary of the readers, includes only the materials utilized in class.

This study should be followed by many, similar in purpose, to ascertain what is the inherent strength of certain reading methods proposed for use with beginners.

Bibliography

Winch, W. H.: "Teaching Beginners to Read in England; Its Methods, Results and Psychological Bases." Public School Publishing Co., Bloomington, Ill.

Valentine, C. W.: Experiments on the Methods of Teaching Reading. *Journal of Experimental Pedagogy*, Vol. II, pp. 99–112.

Dumville, Benjamin: The Methods of Teaching Reading in the Early Stages. *School World*, Vol. XIV, pp. 408–413.

A COMMENT ON PARTIAL CORRELATION

RAYMOND FRANZEN

University of California

The correlation of x with y when z is constant means the deviations in x, each taken from the average x of all the cases with a like z, correlated with deviations in y, each taken from the average y of all the cases with a like z.

Let $\dfrac{x - r_{xz}\dfrac{\sigma_x}{\sigma_z}z}{\sigma_x\sqrt{1 - r^2_{xz}}} = a$ (deviations in x for a given value of z, divided by the variability of x for given values of z)

Let $\dfrac{y - r_{yz}\dfrac{\sigma_y}{\sigma_z}z}{\sigma_y\sqrt{1 - r^2_{yz}}} = b$ (deviations in y for a given value of z, divided by the variability of y for given values of z)

Then the correlation of x and y with z constant is $\dfrac{\Sigma ab}{n}$. This shows the relationship between two variables, the third variable being constant for each, in terms of partial deviations expressed as multiples of the partial sigmas.

It is desirable sometimes to know the relationship between a and y or between x and b. We have situations where we want to use partial deviations expressed as multiples of a partial sigma for one variable and the deviations from the mean of the whole distribution expressed as multiples of the sigma of the whole distribution for the other. Let x = reading difficulty of texts. Let y = vocabulary difficulty of the same texts and let z = the interest of the children as expressed by preference in choice of books when presented to classes in pairs. The question may arise as to how interest correlates with style when we mean by *style* reading difficulty apart from vocabulary difficulty. This is not the correlation between x and y constant and z with y constant. It is the correlation between x with y constant and z. That is, we wish to take the effect of vocabulary out of the reading measures, but not out of the interest. We want to find the correlation between style and interest. Let us call this correlation of (x independent of y) and (z), $r_{(x.y)z}$.

Let x = bonded debt of school districts. Let y = investment of school districts. Let z = wealth of these districts. At present, a

common procedure for controlling one variable is to use ratios. A calculation of the correlation between $\frac{x}{y}$ with z is the calculation of the correlation between bonded debt per thousand dollars invested and the wealth of the district. This is not to be confused with the correlation between bonded debt per thousand dollars invested and wealth per thousand dollars invested. To find the relation of x with z, both independent of y, we may better use the correlation of x with z when y is constant, than the correlation of $\frac{x}{y}$ with $\frac{z}{y}$, because ratios are functions of the zeros of the variables which are often arbitrary, and because it is much easier to make errors of interpretation in the correlation of ratios than in the interpretation of partial correlations. The correlation of x with z, both independent of y, is

$$r_{xz.y} = \frac{r_{xz} - r_{xy}\, r_{zy}}{\sqrt{1 - r^2_{xy}}\,\sqrt{1 - r^2_{zy}}}.$$

It is desirable to have a partial correlation formula which gives the relation of (x independent of y) with (z), so that it may be used instead of the correlation of $\frac{x}{y}$ with z. We may call this $r_{(x.y)z}$.

Another example may not be out of place. Let x = time taken by rats to run a maze. Let y = the number of whole errors made by the rats. Let z = the number of partial errors made by the rats. The problem is to find out whether these partial errors express caution and timidity. If they do, they should be correlated with the time, irrespective of gross errors made because time, independent of errors, expresses such timidity. Otherwise stated, the question is how far time, irrespective of that caused by insufficient learning, is correlated with the nosing about expressed by partial errors. The individual differences in partial error scores of rats, however, which scores are correlated with gross errors, should not be excluded when our purpose is as stated above, because these timidities are themselves related to learning. Therefore, we do not want $r_{xz.y}$ but $r_{(x.y)z}$.

There is still another kind of partial correlation that is needed. We wish to express the correlation of x(when x is independent of w) with y (when y is independent of z). Let the data be again maze-running records of rats. Let x = errors made in a given number of runs. Let y = number of perfect runs made in this same practice period. Let z = partial errors made, that is, nosing around blind

alleys without any definite entry. Let w = time of runs. Now, to find the relation between learning measured by errors and learning measured by perfect runs, it is desirable to purge our records of the effect of varying caution in the rats and varying speed. They are both irrelevant, one being temperamental and the other motor. Errors are a better measure of learning when they are independent of time, since fast rats make more errors because they are fast, entirely apart from their learning capacity. Perfect runs are a better measure of learning when they are independent of partial errors since caution and timidity expressed by many partial errors interfere with number of perfect runs. Now, it is conceivable that taking time out of errors and partial errors out of perfect runs is better than taking time and partial errors out of each, since the relation of time to perfect runs may be a learning relation and the relation of partial errors to errors may also be something we wish to retain. In any case to have this new result will add to the interpretation.

Taking both z and w out of the correlation of x with y is, of course,

$$r_{xy.zw} = \frac{r_{xy.w} - r_{xz.w}\, r_{yz.w}}{\sqrt{1 - r^2_{xz.w}}\,\sqrt{1 - r^2_{yz.w}}}$$

Let us call the correlation between x (independent of w) and y (independent of z) $r_{(x.w)(y.z)}$. This and $r_{(x.y)z}$ need algebraic statement. Their usefulness may be limited, but they are very important when they are needed. The writer found the correlation between style and interest in Grade VI history texts impossible of attainment by any other method. Here we definitely needed to exclude the effect of vocabulary difficulty from the comprehension scores and wished to retain it in our distinctions of interest.

$$\begin{aligned} r_{(x.y)z} &= \frac{\Sigma\left(x - r_{xy}\frac{\sigma_x}{\sigma_y}y\right)(z)}{n\,(\sigma_x\sqrt{1 - r^2_{xy}})\,(\sigma_z)} \\ &= \frac{\Sigma xz - \Sigma yz r_{xy}\frac{\sigma_x}{\sigma_y}}{n\sigma_x\sigma_z\sqrt{1 - r^2_{xy}}} \\ &= \frac{n\sigma_x\sigma_z r_{xz} - n\sigma_y\sigma_z r_{yz} r_{xy}\frac{\sigma_x}{\sigma_y}}{n\sigma_x\sigma_z\sqrt{1 - r^2_{xy}}} \\ &= \frac{r_{xz} - r_{yz}r_{xy}}{\sqrt{1 - r^2_{xy}}} \end{aligned}$$

This is the correlation of x with z when the influence of y is excluded from x but not from z. One of our examples above demands the correlation of x with y when the influence of w is excluded from x and the influence of z is excluded from y.

$$r_{(x.w)(y.z)} = \frac{\Sigma\left(x - r_{xw}\frac{\sigma_x}{\sigma_w}w\right)\left(y - r_{yz}\frac{\sigma_y}{\sigma_z}z\right)}{n(\sigma_x\sqrt{1 - r^2_{xw}})(\sigma_y\sqrt{1 - r^2_{yz}})}$$

$$= \frac{\Sigma xy - \Sigma xzr_{yz}\frac{\sigma_y}{\sigma_z} - \Sigma ywr_{xw}\frac{\sigma_x}{\sigma_w} + \Sigma zwr_{xw}\frac{\sigma_x}{\sigma_w}r_{yz}\frac{\sigma_y}{\sigma_z}}{n\sigma_x\sigma_y\sqrt{1 - r^2_{xw}}\sqrt{1 - r^2_{yz}}}$$

$$= \frac{n\sigma_x\sigma_y r_{xy} - n\sigma_x\sigma_z n_{xz}r_{yz}\frac{\sigma_y}{\sigma_z} - n\sigma_y\sigma_w r_{yw}r_{xw}\frac{\sigma_x}{\sigma_w} + n\sigma_z\sigma_w n_{zw}r_{xw}\frac{\sigma_x}{\sigma_w}n_{yz}\frac{\sigma_y}{\sigma_z}}{n\sigma_x\sigma_y\sqrt{1 - r^2_{xw}}\sqrt{1 - r^2_{yz}}}$$

$$= \frac{r_{xy} - r_{xz}r_{yz} - r_{yw}r_{xw} + r_{zw}r_{xw}r_{yz}}{\sqrt{1 - r^2_{xw}}\sqrt{1 - r^2_{yz}}}$$

This last formula is most useful in the calculation of reliability coefficients. Suppose that x be the average judgment of 10 examiners of say 100 English compositions, and y be the average judgment of these same examiners of another set of English compositions written by the same 100 individuals who wrote the first set. Now, to get the correlation of x with y, irrespective of the way that x and y are affected by misspelling, it is not proper to use scores in spelling made by the 100 individuals on the two essays that each wrote since an individual may make many mistakes on his first composition and few on his second, and vice versa, because of the choice of words. Then his score on x is affected by the misspellings on the first composition and his score on y is affected by misspellings on the second composition. As far as judges rate compositions differently because of misspelling, they do so because of misspelling in the composition they are rating. Calling number of words misspelled on the first composition w and number of words misspelled on the second composition z, what we want is the correlation of x independent of w with y independent of z —not the correlation of x with y, both independent of z plus w. This is $r_{(x-w)(y-z)}$. which is derived above.

NOTES ON ARTICLES IN EDUCATIONAL PSYCHOLOGY IN CURRENT ISSUES OF OTHER MAGAZINES

REPORTED BY JAMES E. MENDENHALL
Research Associate, Institute of Educational Research, Teachers College
Columbia University

Intelligence Testing

A Study of Mental Testing in Relation to Anthropology. Beatrice Blackwood. Mental Measurement Monographs, Serial No. 4, December, 1927. A discussion of the difficulties met in testing peoples with strikingly different environmental backgrounds. A preliminary report is included of the results of testing certain racial groups with the International Group Mental Test.

A Study of the Reliability of Mental Tests as Used in Oklahoma City. C. L. Cushman. The Journal of Applied Psychology, December, 1927, 509–511. Reliabilities of .74 (*N* 144) on the Binet and of .78 (*N* 52) Otis Self-administering Intelligence Tests are reported. Retesting with the Binet tends to show that dull children are under-rated and that bright children are over-rated on the first test.

American Council Psychological Examination for 1926 *at Purdue University.* John M. Stalnaker. School and Society, Jan. 21, 1928, 86–88. A comparison between "honor," "normal," "probation" and "withdrew" students on the various sections of this psychological examination shows a ranking order of significance for predicting scholastic success as follows: (1) Arithmetic, (2) number completion, (3) proverbs, (4) artificial language, (5) opposites, (6) analogies, (7) completion. On the test as a whole a correlation of .57 (*N* 982) with scholastic success was secured.

The Intelligence of High School Pupils. Julien C. Aldrich. The School Review, Nov., 1927, 699–706. The children of the "non-laboring group" were found to secure a higher average IQ by the Otis SA test than that of the "laboring" group.

A Comparative Study of 100 *Italian Children at the Six-year Level.* Kathryn Ewart Lerota. The Psychological Clinic, Oct., 1927, 216–231. The children were tested with Witmer Formboard and Cylinders, Slot Maze A, Binet Test, in Physical Measurements and in School Proficiency. The 100 Italian children were found to be neither inferior nor superior in intelligence and educability to an average six-year group. The inferiority of the Italian group is attributed to a language handicap.

Speed in Simple and Serial Action as Related to Performance in Certain "Intelligence" Tests. Paul R. Farnsworth, Robert H. Seashore and Miles A Tinker. The Pedagogical Seminary, Dec., 1927, 537–551. Thirty-four college students were completely tested. An important conclusion was that "the Army Alpha test tended to become in the main a serial action test . . . but the Ohio State and Thorndike remained content tests on which the speed variable appeared to be negligible."

The Reliability and Validity of the Wallin Peg Boards. Florence L. Goodenough. The Psychological Clinic, Oct., 1927, 199–215. The test was administered to 100 two-, 100 three-, and 100 four-year olds. The children were retested on this same board. Reliability coefficients were secured as follows: .794 for age two; .688 for age three; .583 for age four. "The average correlation with the Kulhman-Binet given on the same day was .507 for single year age groups."

Measurement of Achievement

Upward vs. Downward Addition. B. R. Buckingham. Journal of Educational Research, Dec., 1927, 315–322. The practice and testing of 122 pairs of pupils in Grades II and III in single column addition revealed a significant difference in favor of the downward addition.

The Correlation between Achievement and Capacity in Music. Frances A Wright. Journal of Educational Research, Jan., 1928, 50–56. Correlations (of .45 to .73) are found between subjective tests in musical ability and the Seashore tests for college freshmen in the department of music.

Dates and Historical Perspective. Benjamin R. Showalter. The Historical Outlook, Jan., 1928, 28–31. The conclusion is reached that "historical perspective" . . . is present in a larger degree than is knowledge of specific dates in children who have completed the first six grades of the elementary school. Eleven hundred four children in the classes in different parts of the United States were tested.

Objective Measurement in General Science. Samuel R. Powers. Teachers College Record, Jan., 1928, 345–349. The reliability coefficient for scores on two forms of a test in general science was .85, .01.

Comparative University Student Achievement. Winona M. Perry. The Pedagogical Seminary, Dec., 1927, 634–642. A great overlapping between freshmen, sophomores and juniors in achievement in educational psychology was found. About 39 per cent of the freshmen reached or exceeded the median of the sophomores and 60 per cent of juniors reached or exceeded the median of the sophmores.

The IQ and the Individual. W. H. Pyle. School and Society, Dec. 17, 1927, 788–790. A comparison of very high with very low IQ's reveals certain functions in which the low group compares very favorably with the high group.

Educational and Vocational Guidance

College Student Personnel Problems. R. A. Brotemarkle. The Journal of Applied Psychology, Dec., 1927, 415–436. The data from individual specific ability tests, emotional tests, general intelligence tests, and a social rating were used in the diagnosis of personnel problems.

Tests and High-school Records as Indicators of Success in an Undergraduate School of Business. Arthur W. Kornhauser. Journal of Educational Research, Dec., 1927, 342–356. A study of the records and tests of students entering the School of Commerce and Administration of the University of Chicago revealed the following conclusions: "The correlations with first year scholarship are in general, closest for a reading comprehension test; intelligence tests come next; high school averages are last . . . Beyond the first year, as a whole, the test correlations decrease sharply while the coefficients for high school marks increase or remain constant."

The Predictive Value of Group Intelligence Tests. W. L. Guiler. Journal of Educational Research, Dec., 1927, 365–374. Eighty college freshmen were tested on two forms each of the Ohio College Association Test, the Otis Self-administering Test and the Terman Group Test. The tests' scores checked against first-year marks lead the author to conclude that (1) the Terman is slightly superior in predicting scholarship. (2) The tests agree much better on the first and last quarter placement of students and (3) analogies, arithmetic, number series, reading and word meaning seem to have more predictive merit than have other types.

Character and Personality

An Experimental Test of Intellectual Honesty. George Frederick Miller. School and Society, Dec. 31, 1927, 852–854. A technique to determine whether college students will allow the incorrect markings of their test papers to pass shows that a mature group of students is more "honest intellectually" than an immature group.

A Study of Self-ratings by Children. Elizabeth B. Hurlock. The Journal of Applied Psychology, Dec., 1927, 490–502. Of the 12,690 responses made by a group of 423 children from Grades VII and VIII only 6 per cent were ones relating to socially undesirable character traits. There were no significant differences between the white and the negro group in rating tendencies. Boys marked more of the socially undesirable traits than did the girls. Children tend to overestimate themselves in the desirable traits and underestimate themselves in the undesirable traits.

The Will-temperament of Indians. Thomas R. Garth and Mary A. Barnard. The Journal of Applied Psychology, Dec., 1927, 512–518. A comparison between the performances of Indians and the performances of Whites on the Downey Will-temperament Test is made.

Selection of College Majors as a Personality Expression. J. Bateman Young and Edwin Shoemaker. School and Society, Jan. 28, 1928, 119–120. A combination of an introversion-extroversion rating with an intelligence test seems to give a better differentiation of the major groupings than the intelligence test alone.

Word Studies

Combined Word Studies. Edward William Dolch. Journal of Educational Research, Jan., 1928, 11–19. A "Combined Word Study List" is made from 15 word studies.

A Study of the Recurrence of Words in Certain Primers. Mary Isabel Rankin. The Elementary School Journal, Dec., 1927, 278–285. A study was made of three primers appearing in 1907, 1914 and 1925 respectively. Little agreement as to vocabulary, introduction of new words, or review was found.

A Vocabulary Study of the English and Metric Units of Measurement Used in Secondary-school Science Textbooks. Oscar Himebaugh. Educational Research Bulletin, Nov. 9, 1927, 339–342. Five textbooks were analyzed in each of the five sciences, general science, physical geography, biology, physics and chemistry. A vocabulary of the units of measurement in order of frequency was thus determined.

Studies Bearing on Curricular Materials

College Preparation for Reference Work. W. W. Charters. School and Society, Feb. 4, 1928, 150–152. This report is a compilation of data acquired from the questions asked of reference librarians in 18 cities. The results show a leading interest of patrons in social sciences, science and the æsthetic fields respectively. The results indicate the fields with which the student preparing for library work should be familiar.

Overlapping of Content Material in Social Science Textbooks. E. J. Dahl. The Historical Outlook, Feb., 1928, 80–87. A detailed topical examination and page count of 41 textbooks in the senior high school social sciences revealed a significant degree of overlapping in the topics covered by books in civics, economics, sociology and problems of democracy.

An Objective Method of Determining Grade Placement of Children's Reading Material. Mabel Vogel and Carleton Washburne. The Elementary School Journal, Jan., 1928, 373–381. A technique is represented by which a reading book may be rated in terms of score on the paragraph-meaning section of the Stanford Achievement Test.

Social Attitudes

A Study of the Social Intelligence of High School Pupils. Edith Louise Grosvenor. American Physical Education Review, Nov., 1927, 649–657. One hundred thirty six girls in Grade IX were tested with the George Washington University Social Intelligence Test, The Terman Group (B) Test and academic subject tests. Correlations were secured as follows: the Social Intelligence Test with Terman Group .75, with physiological age .466.

The Civic Attitudes of High School Sophomores. O. F. Fowler. School Review, Jan., 1928, 25–37. The conclusion reached is that a score on the Hill Civic Attitudes Test involves the variables of reading, reasoning, judgment and vocabulary ability.

Miscellaneous

The Validity of the Medical Examiner's Rating in the Administration of Physical Education. American Physical Education Review, Dec., 1927, 707–717. Forty-one boys, ages 12–14, were rated by a medical examiner and a teacher as to general physical efficiency. These ratings were checked against a "cardiac efficiency" and a "motor accomplishment" test. The conclusion reached is that "the medical examiner's rating is unquestionably doubtful," more so than that of the teacher. Secondly, that functional tests should be used to determine physical efficiency.

NEW PUBLICATIONS IN EDUCATIONAL PSYCHOLOGY AND RELATED FIELDS OF EDUCATION

CONDUCTED BY FRANCES M. FOSTER

The Construction of School Readers in the Scientific Manner

Child-story Readers, by Frank N. Freeman, Grace E. Storm, Eleanor M. Johnson and W. C. French. Chicago, New York: Lyons and Carnahan, 1927.

Of the school reading material which appeared in 1927, the "*Child-story Readers*" illustrate the most rigid and vigorous application of the "new psychology" to textbook making. This psychology is based principally upon the results of scientific investigations and it is these results, whether definite or qualified, which have determined the construction of these books. The series was made by a group of school workers in collaboration with Professor Frank N. Freeman. To date it consists of a Primer, First, Second, and Third Readers, Teaching Manual, and much exercise material.

In evaluating the school reader today, one must necessarily consider its function. In my judgment, the use of a so-called basal text is a makeshift. Ideally, there should be in every school building many little books, covering a wide range of topics for children of different ages. In most cases not whole sets of books are required. Two or three copies of each book are quite enough. This is the best way to provide for individual differences. But, unfortunately, very few of these books have been written as yet and, until they are, we must attempt to accomplish this tremendous task through the use of a "reader."

The Second and Third "*Child-story Readers*" satisfy this standard very well. They are attractively bound. A favorable feeling toward the book is established even before the child opens it, and when he glances through to look at the pictures. The choice of material is new and varied. There is about an equal amount of "literary" and factual material so that the children can read both "for fun" and to get information. What a pleasant change from the old, to find the

charm of Selma Lagerlöf and other modern authors! But how unfortunate, indeed, to have had to wait for a "scientific" investigation to justify giving our children some of the facts of life.

The most fundamental characteristic of these second and third grade materials, however, is the way they create in the children dynamic reading attitudes—the desire to read. They emphasize reading for meaning, interpretation, and understanding. "Read to find out . . . " "to know how many parts to the story," and other directions at the beginning of each story establish a definite mind set toward the selection to be read. The attention is held and the effort is keen. A check at the end of the story helps the child to evaluate his own reading. If he has not read carefully, re-reading is necessary. All of this is done silently. Oral reading follows to fit particular situations. Provision for individual difference is made by allowing each child to go at his own rate. So much for the Second and Third Readers.

The whole atmosphere of the First Grade material, however, indicates again in my judgment too much respect for statistical method and too little respect for that understanding of child interests and needs that comes with intimate association with children. It is true, of course, that the results of scientific studies must be used in the construction of school reading books. Vocabulary must be checked against available word lists. There must be attention to phrasing and length of line in order to expedite the fixing of correct eye movements. And when the interests of children have been discovered by careful and prolonged scientific procedure, the material of reading books will be based upon them.

But that time has not yet arrived. The recommendations of the Dunn investigation, which form the basis for selecting the materials of these readers, are limited application. They are based on subjective measures—teachers' judgments and artificial pupil preferences—which were not obtained under normal reading situations over a long period of time. "Interests" were rated by elaborate statistical procedure (partial correlation) using such abstract concepts as *animalness*, *childness*, *poeticalness*, *adultness*, etc., to characterize a selection. As scientific study, that procedure does not go beyond mere summarizing of judgments and preferences. This should have been recognized by the authors of the new textbooks. In this particular case, the statistical method has been taken so seriously that poetry has been excluded from the Primer and the First Reader! What a

pity to deprive the children who use these books of the joy of reading over and over again (as they do) the delightful poems of Walter de la Mare, Carl Sandburg, Rachel Field, and others, because a statistician concluded: "the tendency seems to be against rather than for . . . "

The same tendency to adhere to a formula is evident in the Manual, prepared by Eleanor Johnson. There is rigid and efficient lesson planning. Mother Goose rhymes form the basis for the pre-primer lessons. For these are substituted, intermittently, group stories which are based on the children's experiences and activities. Unfortunately, however, the group stories are units in themselves and do not lead into the primer experiences. With the multiplicity of children's interests, it seems safe to suggest that they should be used more frequently. The rhymes may then be used for pure enjoyment, and not for endless repetition and drill in learning to read. Nothing will kill the beginnings of the appreciation for poetic expression more quickly than having the class "take turns in reciting."

The supplementary silent reading tests are a result of the effort to furnish silent reading drill in order to keep children "busy" at their seats. They are decidedly unnatural and may completely destroy the attitudes one might wish to build up toward *creative* drawing and pictures. A booklet containing pictures, directions, Yes-No exercises and others, provides the child with something to do. Here are some of the directions:

"Make Peter green." "Mother Elephant is green." "Baby Elephant is orange." (In one situation, the children are given their choice. The direction is, "Make the teacher like you want her.")

In spite of these differences between the Second and Third books on the one hand and the beginning material on the other, this series is undoubtedly the best series of readers available today. In my judgment it approximates most nearly the ultimate goals toward which we are striving in our reading materials.

LOUISE C. KRUEGER.

Browning School, New York City.

Measurement in Secondary Education, by Percival M. Symonds. New York: The Macmillan Company, 1927. Pp. XXV + 588.

Ability Standards for Standardized Achievement Tests in the High School, by Percival M. Symonds. New York: Bureau of Publications, Teachers College, Columbia University. Pp. VII + 91.

In order that education shall advance in its subject-matter and methods, it is indeed important that the discoveries of the research expert be made accessible to the worker on the job. A great deal of the misunderstanding and ignorance arising in regard to measurements are direct outgrowths of a gap in knowledge between these two groups.

"Measurement in Secondary Education" should render a significant service in helping to span this gap of school practice behind scientific research.

The materials of this book might be divided into three main heads: A description of the tests in intelligence and the measurements available in the high school subjects; a section on methods of handling test scores; and a section on the uses of test results. The chapters dealing with the criteria for the choice of tests, the prediction of success in high school and in college, the use of tests in guidance, in promotion, in ability grouping and marking and the use of informal tests in teaching—these are "high spots" in the book.

Especially to be commended is the manner in which the author brings a great number of scientific studies to support his recommendations. In addition to this marshalling of pertinent scientific knowledge, the conclusions have been tempered by a broad conception of the function of the measurement movement.

The second of these books, "Ability Standards," presents the results of an extensive program of testing some 38 high schools in intelligence and in achievement. The tests were given in December 1, March 1 and June 1; thus standards for these achievement tests for different periods of the year were determined. A method is given by which it may be determined whether a pupil is working up to his capacity as measured by an intelligence test. The norms, standards and devices incorporated in this book should prove very helpful to anyone engaged in high school testing work.

These two books should find their way into the hands of all those who are interested in the improvement of secondary education. The perspective of the measurement movement presented may well be characterized as both intelligible and intelligent.

JAMES E. MENDENHALL.

The Lincoln School.

Modern Methods in High School Teaching, by Harl R. Douglass. Houghton Mifflin Company, 1926. Pp. XVIII + 544.

A book which brings together into one volume the facts relating to the best teaching procedures in the secondary school, is obviously a notable contribution. It is written from "the viewpoint that secondary education consists in assisting child nature to grow and unfold, and in guiding youth by furnishing experiences favorable to the acquisition of information, habits, skills, ideals, and attitudes which are the expression of the learner's self in the direction of the balanced individual-social aim of the school."

Beginning with a chapter on the outcomes of teaching, the author takes up in turn procedures relating to questioning, assignment and reviews, planning instruction, study, use of visual aids, the socialized problem and project techniques, new examination methods and a final chapter on controlled classroom experimentation.

In view of the author's aim to produce a basic volume on "the numerous and important recent developments in teaching practice," a noticeable shortcoming is the scarcity of references in the body of the text to specific experimental studies which yield the basis for summaries included.

There is a growing tendency in the production of basic texts which summarize the literature of education to cite such reference by the copious use of footnotes or other devices so that the critical reader may evaluate the evidence upon which the conclusions are based. The recent books by Freeman, Koos, Symonds, Uhl and many others, are examples in point. In contrast to this shortcoming, however, there are many evidences within the covers of this volume that Professor Douglass has had first hand experience with many of the procedures which he has summarized. The book is highly readable. Each chapter is preceded by an outline covering the main points to be discussed and followed by a series of questions and exercises. Select references with succinct, pertinent annotations are appended to each chapter. Progressive educators and teachers in the field of secondary education can not afford to be unfamiliar with this book.

C. O. Mathews.

Ohio Wesleyan University.

PUBLICATIONS RECEIVED

General and Applied Psychology

Gruenberg, B.C.: *Outlines of Child Study.* New York: The Macmillan Company, 1927, pp. XXII + 289.

Kline, L.W. and F. L.: *Psychology by Experiment.* Boston: Ginn and Company, 1927, pp. XII + 339.

Lund F. H.: *Psychology, The Science of Mental Activity.* New York: A. G. Seiler, 1927, pp. XIII + 488.

Morgan, J. J. B. and Gilliland, A. R.: *An Introduction to Psychology.* New York: The Macmillan Company, 1927, pp. IX + 319.

Phillips, D. E.: *An Elementary Psychology.* Boston: Ginn and Company, 1927, pp. V + 420.

Smith, E. D.: *Psychology for Executives.* New York: Harper and Brothers, 1928, pp. XII + 262.

Templin, O. and McCracken, A.: *A Guide to Thinking.* Garden City: Doubleday, Page and Company, 1927, pp. XIV + 252.

Thompson, M. K.: *The Springs of Human Action.* New York: D. Appleton and Company, 1927, pp. XVI + 501.

Weld, H. P.: *Psychology as Science.* New York: Henry Holt and Company, 1928, pp. XI + 297.

Woodbridge, F. J. E.: *The Realm of Mind.* New York: Columbia University Press, 1926, pp. VIII + 141.

Psychology of the School Subjects

Blackhurst, James Herbert: *Investigations in the Hygiene of Reading.* Baltimore: Warwick and York, 1927, pp. 63.

Bowers, Henry: *Transfer Values of Secondary School Science.* Toronto: The University of Toronto Press, 1927, pp. 96.

Buswell, G. T.: *A Laboratory Study of the Reading of Modern Foreign Languages.* New York: The Macmillan Company, 1927, pp. XII + 100.

Carlsson, Victoria: *A Bibliography for Cookery Investigation Problems.* New York; Bureau of Publications, Teachers College, Columbia University, 1927, pp. V + 68.

Chapman, Harold B.: *Organized Research in Education.* Columbus, Ohio: The Ohio State University Press, 1927, pp. X + 221.

CORYELL, NANCY GILLMORE: *An Evaluation of Extensive and Intensive Teaching of Literature.* New York: Bureau of Publications, Teachers College, Columbia University, 1927 pp. VII + 201.

JUDD, CHARLES HUBBARD: *Psychological Analysis of the Fundamentals of Arithmetic.* Chicago: The University of Chicago, February, 1927, pp. X + 121.

WEST, MICHAEL: *Learning to Read a Foreign Language.* London: Longmans, Green and Co., 1926, pp. XI + 56.

WILEY, J. A: *Practice Exercises in Supervised Study and Assimilative Reading.* Cedar Falls, Iowa: Iowa State Teachers College, 1922, pp. 112.

WILLING, MATTHEW H.: *Valid Diagnosis in High School Composition.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VII + 64.

SOCIAL PSYCHOLOGY AND SOCIOLOGY

DEXTER, ROBERT CLOUTMAN: *Social Adjustment.* New York: Alfred A. Knopf, 1927, pp. XII + 424.

OGBURN, WILLIAM FIELDING and GOLDENWEISER, ALEXANDER: *The Social Sciences and Their Interrelations.* Boston: Houghton Mifflin Company, 1927, pp. VIII + 506.

SPROWLS, JESSE WILLIAM: *Social Psychology Interpreted.* Baltimore: The Williams and Wilkins Company, 1927, pp. XII + 268.

ZNANIECKI, FLORIAN: *The Laws of Social Psychology.* Chicago: The University of Chicago Press, 1925, pp. VIII + 320.

SCHOOL ADMINISTRATION

COOK, W. A.: *Federal and State School Administration.* New York: Thomas Y. Crowell Company, 1927, pp. XVI + 373.

COOK, W. A.: *High School Administration.* Baltimore: Warwick and York, 1926, pp. IX + 378.

CUBBERLEY, E. P.: *State School Administration.* Boston: Houghton Mifflin Company, 1927, pp. XV + 773.

PITTENGER, B. F.: *An Introduction to Public School Finance.* Boston: Houghton Mifflin Company, 1925, pp. XVI + 372.

MONOGRAPHS

ANDERSON, EARL WILLIAM: *The Teacher's Contract and Other Legal Phases of Teacher Status.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. IX + 180.

BARLETT, LESTER WILLIAM: *State Control of Private Incorporated Institutions of Higher Education.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. 95.

BENDER, JOHN FREDERICK: *The Functions of Courts in Enforcing School Attendance Laws.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VI + 187.

BLANKENSHIP, ALBERT S.: *The Accessibility of Rural Schoolhouses in Texas.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. 62.

COUNTS, GEORGE S.: *The Social Composition of Boards of Education.* Chicago: Department of Education, University of Chicago, 1927, pp. IX + 100.

DYER, WILLIAM PENN: *Activities of the Elementary School Principal for the Improvement of Instruction.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VIII + 102.

EMMONS, FREDERICK EARLE: *City School Attendance Service.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. IX + 173.

ENGELHARDT, N. L. and VON BORGERSRODE, FRED: *Accounting Procedure for School Systems.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. IX + 130.

FORD, WILLARD STANLEY: *Some Administrative Problems of the High School Cafeteria.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VII + 147.

HECK, ARCH O.: *A study of Child-accounting Records.* Columbus, Ohio: Bureau of Educational Research, November 16, 1925, pp. XVI + 245.

JOB, LEONARD BLISS: *Business Management of Institutional Homes for Children.* New York; Bureau of Publications, Teachers College, Columbia University, 1926, pp. XI + 205.

KOOS, FRANK HERMANN: *State Participation in Public School Library Service.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. IX + 246.

LANDIS, BENSON Y.: *Professional Codes.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. XII + 108.

LINTON, CLARENCE: *A Study of Some Problems Arising in the Admission of Students as Candidates for Professional Degrees in Education.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. XII + 163.

LOOMIS, ARTHUR KIRKWOOD: *The Technique of Estimating School Equipment Costs.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VI + 112.

MOREHART, GROVER CLEVELAND: *The Legal Status of City School Boards.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VII + 96.

OLSEN, HANS C.: *The Work of Boards of Education.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VIII + 170.

QUANCE, FRANK M.: *Part-time Types of Elementary Schools in New York City.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VIII + 49.

REYNOLDS, O. E.: *The Social and Economic Status of College Students.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. V + 57.

RUFI, JOHN: *The Small High School.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. IX + 145.

SCHWARTZ, HARWOOD M.: *Improvement in the Maintenance of Public School Buildings.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. IX + 74.

SHAW, FRANK L.: *State School Reports.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. 142.

SMITH, HARRY PEARSE: *The Business Administration of a City School System.* New York: Bureau of Publications, Teachers College, Columbia University, 1925, pp. IX + 129.

TAYLOR, ROBERT B.: *Principles of School Supply Management.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VI + 145.

TODD, WILLIAM H.: *What Citizens Know about Their Schools.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. 86.

WAGENHORST, LEWIS HOCH: *The Administration and Cost of High School Interscholastic Athletics.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. IX + 134.

Report of the American Library Association: Proposed Classification and Compensation Plans for Library Positions. Washington, D. C.: Bureau of Public Personnel Administration, Mills Building, 1927, pp. 208.

Books and Monographs on the Curriculum

Buchanan, M. A.: *A Graded Spanish Word Book.* Toronto: The University of Toronto Press, 1927, pp. 195.

Charters, W. W., Lemon, A. B. and Monell, L. M.: *Basic Material for a Pharmaceutical Curriculum.* New York: McGraw-Hill Company, 1927, pp. XIII + 366.

Craig, G. S.: *Tentative Course of Study in Elementary Science for Grades I and II.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VI + 91.

Davis, C. O.: *Our Evolving High School Curriculum.* Yonkers-on-Hudson, N. Y.: World Book Company, 1927, pp. IX + 301.

Hamilton, O. T.: *The Courts and the Curriculum.* New York City: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VIII + 168.

Harap, H.: *Economic Life and the Curriculum.* New York: The Macmillan Company, 1927, pp. XI + 188.

Hockett, J. A.: *A Determination of the Major Social Problems of American Life.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VII + 101.

Jones, W. B.: *Job Analysis and Curriculum Construction in the Metal Trades Industry.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VI + 104.

McKown, H. C.: *Extracurricular Activities.* New York: The Macmillan Company, 1927, pp. XXI + 617.

Meier, L.: *Health Material in Science Textbooks.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. 104.

Nesmith, M. E.: *An Objective Determination of Stories and Poems for the Primary Grades.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. 85.

Report of the Teachers College Conferences on Homemaking, Homemaking as a Center for Research. New York: Bureau of Publications, Teachers College, 1927, pp. IX + 122.

Sanford, V.: *The History and Significance of Certain Standard Problems in Algebra.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VIII + 102.

Strang, R.: *Subject-matter in Health Education.* New York Bureau of Publications, Teachers College, Columbia University, 1926, pp. 108.

STROH, M. M.: *Literature for Grades VII, VIII and IX.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VII + 110.

STULL, D.: *Tentative Course of Study in Geography.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VIII + 288.

UHL, W. L.: *Secondary School Curricula.* New York: The Macmillan Company, 1927, pp. XX + 582.

GENERAL EDUCATION

AVERILL, L. A.: *Educational Hygiene.* Boston: Houghton Mifflin Company, 1926, pp. XVI + 546.

BENNETT, G. V.: *The Junior High School:* Baltimore: Warwick and York, 1926, pp. VII + 225.

BULL, R. C. and THOMAS, S.: *Freshman Hygiene.* Philadelphia: J. B. Lippincott Company, 1926, pp. X + 288.

CUROE, P. R. V.: *Principles of Education.* New York: Globe Book Company, 1926, pp. V + 138.

DAY, M. S.: *Scheubel as an Algebraist.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. 168.

DOUGLASS, A. A.: *Secondary Education.* Boston: Houghton Mifflin Company, pp. XXX + 649.

FOREST, I.: *Pre-school Education.* New York: The Macmillan Company, 1927, pp. XIII + 413.

JOHNSON, W. H.: *Fundamentals in Visual Instruction.* Chicago: The Educational Screen, Inc., 1927, pp. 104.

MONROE, W. S.: *Directing Learning in the High School.* Garden City: Doubleday, Page and Company 1927, pp. X + 577.

MASSO, GILDO: *Education in Utopias.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VII + 200.

SCHMALHAUSEN, S. D.: *Humanizing Education.* New York: The New Education Publishing Company, 1926, pp. 343.

TURNBULL, G. H.: *The Educational Theory of J. G. Fichte.* Liverpool: Hodder and Stoughton, 1926, pp. 283.

WALSH, M. J.: *Teaching as a Profession.* New York: Henry Holt and Company, 1926, pp. IX + 387.

WAPLES, D.: *Problems in Classroom Method.* New York: The Macmillan Company, 1927, pp. XXII + 609.

Comparative Education

Arent, Emma: *The Relation of the State to Private Education in Norway.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. IX + 94.

Monroe, Paul: *Essays in Comparative Education.* Republished Papers. New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VII + 258.

Totah, Khalil A.: *Contribution of the Arabs to Education.* New York: Bureau of Publications, Teachers College, Columbia, University, 1926, pp. V + 105.

Studies in Health and Physical Education

Lerrigo, Marion Olive: *Health Problem Sources.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. IX + 151.

McHale, Kathryn: *Comparative Psychology and Hygiene of the Overweight Child.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VI + 123.

Saxman, Ethel J.: *Student's Use in Leisure Time of Activities Learned in Physical Education in State Teachers Colleges.* New York: Bureau of Publication, Teachers College, Columbia University, 1926, pp. IX + 90.

Vocational Guidance

Hull, Clark L.: *Psychological Tests and the Differentiation of Vocational Aptitudes.* Iowa City, Iowa: University of Iowa Monographs in Education, University of Iowa, July, 1926, pp. 24 to 35, inc.

Myers, George E.: *The Problem of Vocational Guidance.* New York: The Macmillan Company, 1927, pp. VII + 311.

Teeter, Verl A.: *A Syllabus on Vocational Guidance.* New York: The Macmillan Company, 1928, pp. XII + 217.

Treat, Katherine: *Vocational Adjustment Bureau for Girls.* New York: Vocational Adjustment Bureau, 336 East 19th Street, 1926, pp. 54.

Tests and Measurements

Brown, Andrew W.: *The Unevenness of the Abilities of Dull and of Bright Children.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VII + 112.

CUNNINGHAM, KENNETH S.: *The Measurement of Early Levels of Intelligence.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. V + 74.

KENNON, LAURA H. V.: *Tests of Literary Vocabulary for Teachers of English.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VII + 78.

KUHLMANN-ANDERSON: *Intelligence Tests, Instruction Manual.* Minneapolis: The Educational Test Bureau, 1927, pp. 87.

LINCOLN, EDWARD ANDREWS: *Sex Differences in the Growth of American School Children.* Baltimore: Warwick and York, 1927, pp. XII + 189.

MILLER, E. MORRIS: *Brain Capacity and Intelligence.* Tasmania: John Vail, 1926, pp. 79.

NEUMANN, GEORGE BRADFORD: *A Study of International Attitudes of High School Students.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VI + 120.

PRESSEY, LUELLA COLE and PRESSEY, SIDNEY LEAVITT: *Methods of Handling Test Scores.* Yonkers-on-Hudson, N. Y.: World Book Company, 1926, pp. IV + 60.

ROGERS, FREDERICK RAND: *Tests and Measurement Programs in the Redirection of Physical Education.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. XIX + 166.

SANGREN, PAUL V.: *The Measurement of Achievement in Silent Reading.* Kalamazoo: Western State Teachers College, 1927, pp. 88.

WOOD, BEN D.: *New York Experiments with New-type Modern Language Tests.* New York: The Macmillan Company, 1927, pp. XIX + 339.

BOOKS AND MONOGRAPHS ON THE PROBLEM CHILD

CAMERON, H. C.: *The Nervous Child.* Edinburgh: Oxford University Press, 1925, pp. VIII + 233.

COOLEY, EDWIN, J.: *Probation and Delinquency.* New York: Catholic Charities of the Archdiocese of New York, 1927, pp. XV + 544.

GREENE, JAMES SONNETT, and WELLS, EMILIE J.: *The Cause and Cure of Speech Disorders.* New York: The Macmillan Company, 1927, pp. XV + 458.

LAWS, GERTRUDE: *Parent-child Relationships.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. 57.

PIERCE, FREDERICK: *Understanding Our Children.* New York: E. P. Dutton and Company, 1926, pp. X + 198.

ROBBINS, SAMUEL, D.: *Stammering and Its Treatment.* Boston: Boston Stammerers' Institute, 1926, pp. 121.

SEHAM, MAX and GRETE: *The Tired Child.* Philadelphia: J. B. Lippincott Company, 1926, pp. XVI + 342.

SLAWSON, JOHN: *The Delinquent Boy.* Boston: Richard G. Badger Publisher, 1926, pp. VIII + 477.

THOM, DOUGLAS A.: *Everyday Problems of the Everyday Child.* New York: D. Appleton and Company, 1927, pp. 350.

WEXBERG, ERWIN: *Your Nervous Child.* New York: Albert and Charles Boni, 1927, pp. XIV + 178.

WHIPPLE, HELEN DAVIS: *Making Citizens of the Mentally Limited.* Bloomington, Illinois: Public School Publishing Company, 1927, pp. VI + 374.

MONOGRAPHS IN TEACHER-TRAINING

BUCKINGHAM, B. R.: *Supply and Demand in Teacher-training.* Columbus: Ohio State University, 1926, pp. X + 182. $1.50.

CARR, JOHN W., JR.: *Factors Affecting the Distribution of Trained Teachers in the Rural White Elementary Schools of North Carolina.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VII + 91.

ELLIOTT, RUTH: *The Organization of Professional Training in Physical Education in State Universities.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. V + 65.

FINLEY, CHARLES WILLIAM.: *Biology in Secondary Schools and the Training of Biology Teachers.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. 79.

GARRISON, NOBLE LEE: *Status and Work of the Training Supervisor.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VII + 98.

GRANRUD, JOHN: *The Organization and Objectives of State Teachers Associations.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. VII + 71.

HILL, CLYDE MILTON: *A Decade of Progress in Teacher-training.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. 219.

KLYVER, FAYE HUNTINGTON: *The Supervision of Student-teachers in Religious Education.* New York: Bureau of Publications, Teachers College, Columbia University, 1925, pp. VIII + 185.

MCMULLEN, LYNN BANKS: *The Service Load in Teacher-training Institutions of the United States.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. IX + 95.

MYERS, ALONZO FRANKLIN: *A Teacher-training Program for Ohio.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. 144.

SMITH, JAMES M.: *The Training of High School Teachers in Louisiana.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. IX + 101.

STEELE, ROBERT MCCURDY: *A Study of Teacher-training in Vermont.* New York: Bureau of Publications, Teachers College, Columbia University, 1926, pp. IX + 111.

STUART, HUGH: *The Training of Modern Foreign Language Teachers for the Secondary Schools in the United States.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. X + 110.

TEACHING THE SCHOOL SUBJECTS

BERRY, JAMES B.: *Teaching Agriculture.* Yonkers-on-Hudson, New York: World Book Company, 1924, pp. XIV + 230. $2.00.

DAWSON, EDGAR: *Teaching the Social Studies.* New York: The Macmillan Company, 1927, pp. XVI + 405.

FREELAND, G. E., ADAMS, R. M. and HALL, K. H.: *Teaching in the Intermediate Grades.* Boston, Massachusetts: Houghton Mifflin Company, 1927, pp. XVII + 398. $2.15.

LIGDA, PAUL: *The Teaching of Elementary Algebra.* Boston: Houghton Mifflin Company, 1925, pp. XVII + 256. $1.90.

PAYNE, ARTHUR, F.: *Methods of Teaching Industrial Subjects.* New York: McGraw-Hill Book Company, 1926, pp. XX + 290. $3.00.

RIDGLEY, DOUGLAS C.: *Geographic Principles.* Boston, Mass.: Houghton Mifflin Company, 1925, pp. IX + 190. $1.20.

BIBLIOGRAPHIES

WOODRING, MAXIE NAVE, and BENSON, RACHEL THERESA: *Enriched Teaching of English in the High School.* New York: Bureau of Publications, Teachers College, Columbia University, 1927, pp. VII + 104.